Five-Year Review Report

Second Five-Year Review Report for

Jasco Chemical Superfund Site

City of Mountain View, Santa Clara County, California

PREPARED BY
United States Army Corps of Engineers
Seattle District
Seattle, Washington

Approved by: Kathleen Salyer **Date:** 9/28/12

Kathleen Salyer, Chief
Superfund Site Cleanup Branch
U.S. Environmental Protection Agency, Region 9

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Executive Summary

This is the second Five-Year Review of the Jasco Chemical Company Superfund Site located in Mountain View, California. The purpose of this Five-Year Review is to review information to determine if the remedy is and will continue to be protective of human health and the environment. The triggering action for this Five-Year Review (FYR) was the signing of the previous FYR on September 28, 2007.

The Jasco Chemical Company Site is a 2.05 acre lot located at 1710 Villa Street in Mountain View, CA. The Site is in a predominately residential zone, with the Southern Pacific Railroad running along the lot's northern property line.

Jasco Chemical Company began production at the Site in 1976. The production process involved repackaging bulk chemicals into small containers and blending compounds to produce proprietary products. Bulk solvents were received and stored on site before and after processing.

A preliminary groundwater investigation conducted in June 1984 revealed the presence of chemicals in soil and groundwater of the same type as those used and stored at the Jasco facility. These chemicals included 1,1,1-trichloroethane, acetone, creosote, denatured alcohol, kerosene, lacquer thinner, methanol, methylene chloride and paint thinner.

In September 1992, EPA issued a Record of Decision (ROD) to define the necessary action to:

- Address contaminated soils and groundwater,
- Prevent any further migration of contaminants into the groundwater,
- Prevent possible future exposure to the public to contaminated groundwater,
- Prevent contamination of the drinking water aquifer, and
- Provide long term protection to human health and the environment.

The remedy for the Jasco Chemical Company Superfund Site in Mountain View, California included groundwater extraction and treatment in accordance with the requirements of the ROD (1992) as modified by the Explanation of Significant Difference (ESD) (2002). Soil contamination on the Site was remediated using both excavation with on-site bio-treatment and dual vacuum extraction/soil vapor extraction. The Site was also subject to institutional controls to prevent exposure to future site construction workers and potential future residents. The Site reached construction completion in September 2002.

The remedy is functioning as intended by the ROD, as modified by the 2002 and 2012 ESDs, and is considered to be complete. Contaminants remain in Site groundwater as a result of a documented off-site source.

Standards identified in the ROD have been revised. However, these revisions do not affect the protectiveness of the remedy. Exposure pathways identified in the ROD have not changed. The vapor intrusion pathway has been assessed and determined not to be a risk for the chemicals associated with

the Site. Toxicity factors for TCE, PCE, PCP, cis-1,2-DCE, and 1,1,1-TCA have changed since the last five year review. The toxicity values for PCP, PCE, TCE indicate a higher risk from exposure to these chemicals than previously considered, while revisions to toxicity values for 1,2-DCE and 1,1,1-TCA indicate a lower risk. These changes do not affect the protectiveness of the remedy.

No other information has come to light that could call into question the protectiveness of the remedy.

The remedy at the Jasco Site is protective of human health and the environment. All cleanup standards for soil and groundwater described in the ROD, as modified by the ESDs have been achieved.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Jasco Chemical Company		
EPA ID: **CAD009103318**		
Region: 9	**State:** CA	**City/County:** Mountain View/ Santa Clara

SITE STATUS	
NPL Status: Final	
Multiple OUs? No	**Has the site achieved construction completion?** Yes

REVIEW STATUS
Lead agency: EPA **If "Other Federal Agency" was selected above, enter Agency name:**
Author name (Federal or State Project Manager): Alison Fong, Ellen Engberg, Heather Whitney, Jefferey Powers
Author affiliation: USEPA Region 9 and USACE Seattle District
Review period: 5/2011 – 5/28/2012
Date of site inspection: 2/2/2012
Type of review: Policy
Review number: 2
Triggering action date: 28 September, 2007
Due date *(five years after triggering action date)*: 28 September, 2012

Five-Year Review Summary Form (continued)

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the Five-Year Review:
There are no issues identified for the Jasco Site. The remedy is complete and the Site is protective for all future uses.
Issues and Recommendations Identified in the Five-Year Review:
There are no issues identified for the Jasco Site

Protectiveness Statement(s)		
Include each individual OU protectiveness determination and statement. If you need to add more protectiveness determinations and statements for additional OUs, copy and paste the table below as many times as necessary to complete for each OU evaluated in the FYR report.		
Operable Unit: **Jasco Chemical Company Superfund Site**	***Protectiveness Determination:*** **Protective**	***Addendum Due Date (if applicable):***
Protectiveness Statement: The remedy at the Jasco Site is protective of human health and the environment. All cleanup standards for soil and groundwater described in the ROD, as modified by the ESDs, have been achieved.		

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List of Abbreviations

ARAR	Applicable or Relevant and Appropriate Requirement
bgs	below ground surface
BRA	Baseline Risk Assessment
CA	California
CAC	California Administrative Code
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	chemical of concern
1,2-DCE	1,2-Dichloroethene
DVE	Dual vacuum extraction
EPA	U.S. Environmental Protection Agency
ESD	Explanation of Significant Difference
FYR	Five-Year Review
IRIS	Integrated Risk Information System
MCL	Maximum Contaminant Level
MDL	method detection limit
mg/L	milligrams per liter
mg/kg	milligrams per kilogram
NCP	National Contingency Plan
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
OEHHA	Office of Environmental Health Hazard Assessment
PCE	Tetrachloroethylene

PCP	Pentachlorophenol
PRG	Preliminary Remediation Goal
RAO	Remedial Action Objective
RfC	(Inhalation) Reference Concentration
RfD	(Oral) Reference Dose
ROD	Record of Decision
RPM	Remedial Project Manager
RSL	Regional Screening Level
RWQCB	Regional Water Quality Control Board
SDWA	Safe Drinking Water Act
SVE	Soil vapor extraction
1,1,1-TCA	1,1,1-Trichloroethane
TCE	Trichloroethylene
ug/L	micrograms per liter
USACE	U.S. Army Corps of Engineers
VOC	Volatile Organic Compound

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Second Five-Year Review Report
for
Jasco Chemical Company Superfund Site

1. Introduction

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy will continue to be protective of human health and the environment. The methods, findings, and conclusions of FYRs are documented in five-year review reports. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) prepares FYRs pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121 and the National Contingency Plan (NCP). CERCLA 121 states:

> "*If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews."*

EPA interpreted this requirement further in the NCP; 40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii), which states:

> "*If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such actions no less often than every five years after the initiation of the selected remedial action*."

EPA Region 9 and the U.S. Army Corps of Engineers (USACE) conducted the FYR and prepared this report regarding the remedy implemented at the Jasco Chemical Company Site in Mountain View, Santa Clara County, California. EPA is the lead agency for developing and implementing the remedy for the Site. The USACE has provided technical assistance to the EPA in the preparation of this report.

This is the second FYR for the Jasco Site. The triggering action for this statutory review is the previous FYR.The FYR is required due to the fact that hazardous substances, pollutants, or contaminants remained at the Site above levels that allow for unlimited use and unrestricted exposure. The Site consists of a single Operable Unit, which is addressed in this FYR.

2. Site Chronology

Table 1 lists the dates of important events for the Jasco Chemical Company Superfund Site.

Table 1. Chronology of Site Events

Event	Date
Jasco Chemical Company started operations at the Site.	December 1976
Private citizen complained of solvents being dumped at the Site.	January 1983
California Regional Water Quality Control Board requested installation of monitoring wells to determine if groundwater had been contaminated.	June 1983
A preliminary investigation confirmed the presence of contamination in Site soil and groundwater.	June 1984
Jasco Chemical Co. began extracting contaminated groundwater that is treated and discharged to the City of Mountain View sewer system.	February 1987
California Regional Water Quality Control Board issued Cleanup and Abatement Order No. 87-094 requiring Jasco to conduct a remedial investigation.	August 1987
EPA issued an Administrative Order requiring Jasco to complete a Remedial Investigation/Feasibility Study	December 1988
Jasco Chemical Company Site listed on the NPL	October 1989
Remedial Investigation/Feasibility Study completed	February 1991
Proposed Plan distributed for public review.	June 1992
Record of Decision (ROD) signature	September 1992
Declaration of Temporary Restrictions recorded for parcel	April 19, 1993
Tetrachloroethene (PCE) contaminated groundwater is discovered on-site.	1993
EPA approved dual vacuum extraction/soil vapor extraction (DVE/SVE) pilot test system begins operation to evaluate the technology as a remedy for contaminated soil and groundwater.	1995
Soil remedy conducted.	April 1995 – February 1998

Event	Date
PCE response begins with conversion of a monitoring well to DVE.	April 1997
Soil confirmation sample results indicated soil cleanup goals have been achieved.	February 2002
Release of memo to sample under buildings sent to Jasco from EPA.	March 5, 2002
Groundwater extraction and treatment system shut-off.	March 2002
Explanation of Significant Difference finalized to modify the treatment method for both soil and groundwater and establish deed restriction requirements.	September 2002
Final Soil Remediation Report issued.	July 2002
Construction completion achieved.	September 2002
First FYR	September 2007
Covenant and Environmental Restriction on Property recorded for parcel	March 29, 2010
Groundwater monitoring program discontinued per EPA	March 2010
Expert Technical Assistance Report Issued presenting data in support of site closeout	July 2011
Case referral of Villa Street PCE Plume to The Department of Toxic Substances Control (DTSC)	August 24, 2012
Explanation of Significant Difference finalized to clarify the purpose of the deed restriction	September 2012

3. Background

3.1. Physical Characteristics

The Jasco Chemical Company Site is a 2.05 acre lot located at 1710 Villa Street in the City of Mountain View, CA (Figure 1). The surrounding area is residential, dominated by single family homes to the south and the Villa Mariposa apartment complex to the east. Single and multifamily housing is located on Higdon Ave. on the western border of the Site. Villa Street is on the south side of the Site and Southern Pacific Railroad right-of-way borders the Site on the north. The Jasco Site is at an approximate elevation of 60 feet above mean sea level with local topography that slopes gently to the north-northeast. Permanente Creek is the only water body near the Site and is located about 600 feet northwest of the Site. The creek is a perennial, concrete lined channel used primarily for drainage and flood control that drains into San Francisco Bay.

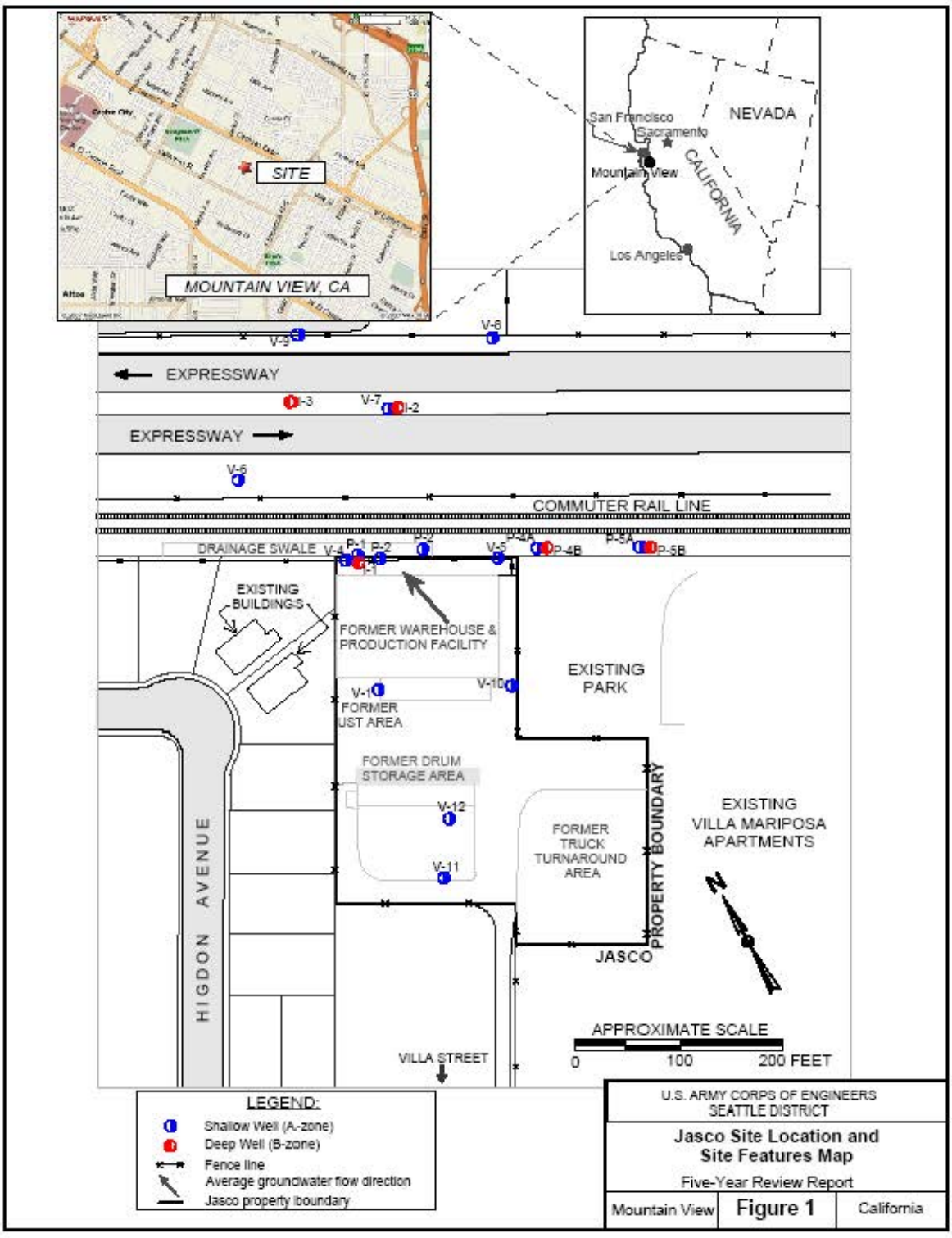

Figure 1. Location Map for the Jasco Superfund Site

3.2. Hydrology

Hydrogeology at the Site is described in three primary hydrostratigraphic units: the perched zone, A-aquifer and B-aquifer. The perched zone is a permeable layer closely tied to precipitation and drought, and does not have a consistent water table. The A- and B-aquifers are the principal water bearing zones at the Site. A fourth hyrostratigraphic unit, the deeper C-aquifer, has not been explored at the Site, but is known to exist regionally (USEPA 1992).

The A-aquifer is found about 30 feet below ground surface, and varies in thickness from a thin lense to about 15 feet. It is separated by a clayey aquitard from the B-aquifer, found from approximately 40 to 60 feet bgs. The B-aquifer averages from 6 to 15 feet in thickness, and is split into smaller layers in some areas. Both zones have a piezometric surface that slopes northward at slightly less than 0.005 ft/ft towards San Francisco Bay to the north, though the precise direction of flow shifts between a north- northeasterly gradient, and a northwesterly one (ITSI 2011).

Pumping tests on well V-4 (screened in the A-aquifer) have resulted in drawdown in the B-aquifer, indicating an interconnection between the two aquifers. No potential conduits connecting the B- and C-aquifers have been identified at the Site (ITSI 2011).

Both the A- and B-aquifers respond to rainfall, and react to both seasonal cycles, and long term trends. The flow direction and gradients also appear to be affected by long term trends, as potential shifts of gradient direction correspond with a general increase in water level elevations caused by increased precipitation recharge from 2002 to 2007, and decrease in precipitation and water level elevations since. Groundwater gradient direction has historically been to the north-northeast. Gradient direction shifted to the north-northwest in the period of the last FYR, but has recently shifted back to the historical north.

The flow direction in both the A- and B-aquifers was to the north in May 2009 and April 2010 during the last two monitoring events, with an average hydraulic gradient of 0.0045 ft/ft in the A-aquifer and 0.0034 ft/ft in the B-aquifer (ITSI 2011).

3.3. Land and Resource Use

Historically, the Jasco Site has been zoned for industrial purposes. Prior to 1970 the Site was zoned as General Industrial and 85% of the property was occupied by the Pacific Press Publishing Association, an industrial printing/publishing concern. With the closure of the Press in 1983, the City of Mountain View reconsidered basic land use provisions in the area. The resulting Villa-Mariposa Area Precise Plan provides for a transition of this older industrial complex into a residential area. The property is currently zoned P (planned community) and industrial/office uses are viewed as nonconforming under the Master Development Plan. Consequently, the Jasco Chemical facility was a nonconforming use and its use was to be terminated by December 1993. This date was extended by the Environmental Planning Commission to December 1995 to allow the facility to remain operating. The facility stopped operating in December 1995.

There are eight municipal water supply wells within a three mile radius of the Site. The City of Mountain View's Well #17 is located approximately 2,000 feet northwest of the Jasco Site. This well was shut off in December 1986 due to concerns that contamination at the Jasco Site might impact the well. Pumping was restarted in Well #17 in 1988 once it was determined that the well was not impacted.

There are a number of beneficial uses of both surface and groundwater. Local surface waters include Permanente Creek and San Francisco Bay. The existing and potential beneficial uses of these surface waters include fish and wildlife habitat, navigation, fishing, shellfish harvesting and industrial service supply. The existing and potential beneficial uses of the groundwater underlying the Site include industrial process water supply, municipal and domestic water supply and agricultural water supply.

3.4. History of Contamination

The Jasco Chemical Company's production process involved repackaging bulk chemicals into small containers and blending compounds to produce proprietary products such as degreasers and paint thinners. Bulk solvents were received in tankers and stored in eight underground storage tanks. Powdered solids were received in 55 pound bags and other solvents were received in 55 gallon drums.

A private citizen complained of solvents being dumped at the Site in January 1983. The California Regional Water Quality Control Board (RWQCB) requested that monitoring wells be installed at the Site to determine if groundwater had been contaminated. A subsequent preliminary groundwater investigation conducted in June 1984 revealed the presence of chemicals in soil and groundwater of the same type as those used and stored at the Jasco facility. These chemicals included 1,1,1-trichloroethane, acetone, creosote, denatured alcohol, kerosene, lacquer thinner, methanol, methylene chloride and paint thinner. A subsequent groundwater sample obtained in April 1985 showed the presence of pentachlorophenol and methylene chloride.

The Jasco Chemical Company Site was listed on the National Priorities List (NPL) in October of 1989.

3.5. Initial Response

In February 1987, the Jasco Chemical Company began extracting contaminated groundwater at the Site. The extracted groundwater was discharged to the Mountain View sewer system under a permit from the city.

On October 2, 1987, the company removed an underground diesel tank from the Site. The tank was corroded with numerous small holes. Samples taken from directly beneath the tank contained diesel, benzene, toluene and xylene.

After completing a soils characterization report and runoff management plan in August 1988, Jasco initiated an interim action. The company removed 572 cubic feet of contaminated soil to the water table (22-28 feet below ground surface) from the drainage swale in October 1988. A surface water collection system was installed to prevent further surface water infiltration in the area of the soil removal. The system consisted of a polyethylene liner that prevents surface water percolation. The area was also graded to direct surface flow toward a sump for collection and discharge to the sanitary sewer system. This action was performed prior to the ROD issued in 1992.

3.6. Basis for Taking Action

The actual or threatened releases of hazardous substances from the Jasco Chemical Company Site, had they not been addressed by implementing the response actions described in the ROD, may have represented an imminent and substantial danger to human health or the environment. Contaminant concentrations in groundwater represented the greatest risk to potential residents. The threat posed by soil contamination was the continued degradation of surface and groundwater resources. The purpose of the response action described by the ROD was to prevent further migration of contaminants into the groundwater, prevent possible future exposure to the public to contaminated groundwater and prevent contamination of the drinking water aquifer.

Hazardous substances that the ROD indicated had been released at the Site in each media include:

Groundwater and Soil

Acetone
Benzene
Chloroethane
1,1-Dichloroethane
1,1-Dichloroethene
1,2-Dichloroethane
cis-1,2-Dichloroethene
Diesel or kerosene mixture
Ethybenzene
Methanol
Methylene chloride
Methyl ethyl ketone
Pentachlorophenol
Tetrachloroethene
Toluene
1,1,1-Trichloroethane
Trichloroethene
Vinyl chloride
Xylene

Surface Water

Methylene chloride
Pentachlorophenol
1,1,1- Trichloroethane
1,1-Dichloroethane

4. Remedial Actions

4.1. Remedy Selection

The ROD for the Jasco Chemical Company Superfund Site was signed on September 30, 1992. Remedial Action Objectives (RAOs) were developed as a result of the data collected during the Remedial Investigation to aid in the development and screening of remedial alternatives to be considered for the ROD. The ROD for the Site identified contaminated soil and groundwater as principle threats at the Site. The ROD identified the following RAOs for the Jasco Site:

- Prevent any further migration of contaminants into groundwater by treating Site soils.
- Prevent possible future exposure of the public to contaminated groundwater.
- Prevent contamination of the drinking water aquifer by treating both contaminated soil and groundwater.

Interim actions had largely addressed concerns related to the contamination of surface water.

The major components of the remedy selected in the ROD included the following (verbatim):

> 1. On-site construction of a liquid phase carbon absorption groundwater treatment plant. Treated groundwater is to be discharged to the sanitary sewer system under permits with the City of Mountain View (No. 491010 and 491520). Continue groundwater treatment until all present and future wells at the Jasco Site meet cleanup standards (Table 2).

Table 2. Selected Cleanup Standards

Contaminant	Groundwater (mg/L)	Soil (mg/Kg)
Acetone	4	30
Benzene	0.001	0.3
Chloroethane	30	4000
1,1- Dichloroethane	0.005	0.6
1,1- Dichloroethene	0.006	2
1,2- Dichloroethane	0.0005	0.03
c-1,2- Dichloroethene	0.006	1
Diesel or kerosene mixture	3	10000
Ethylbenzene	0.68	3000
Methanol	20	200
Methyl ethyl ketone	0.6	9

Contaminant	Groundwater (mg/L)	Soil (mg/Kg)
Methylene chloride	0.005	0.2
Pentachlorophenol	0.001	200
Tetrachloroethene (PCE)	0.005	7
Toluene	1	1000
1,1,1- Trichloroethane	0.2	100
Trichloroethene (TCE)	0.005	3
Vinyl chloride	0.0005	0.02
Xylenes	1.75	2000

2. The groundwater pump and treat system will be operated so that hydraulic control of the Site is maintained to prevent vertical and horizontal expansion of the contaminated groundwater plume.

3. Quarterly groundwater monitoring at all monitoring and extraction wells on the Jasco Site to verify progress toward cleanup standards and to demonstrate that hydraulic control is maintained. The frequency of monitoring decreased to tri-annually two years after confirmation that soil cleanup standards have been achieved. Sampling of groundwater can be decrease to bi-annually once cleanup standards are met in all wells and stabilized for one year.

4. Installation of additional monitoring and extraction wells at locations determined by EPA to improve the performance of the extraction and treatment system.

5. Treatment of all Site soils in the drainage swale contaminated above cleanup standards using an on-site *ex situ* biological treatment reactor. The operation of the reactor will include nutrient amendment of the contaminated soil and an aeration system. The aeration system will have an activated carbon absorption system. Spent carbon used in this system will be disposed on off-site at a permitted facility.

6. Sampling of soil beneath the production facility, the drum storage area and the underground storage tank area within six months of the treatment of soils from the drainage swale. If soils are contaminated above cleanup standards, soil in these areas will be treated in the on-site bio-reactor.

7. Site soils that contain residual contaminant concentration after on-site biological treatment shall be disposed off-site.

8. Jasco Chemical Company will be required to file a restrictive easement in the official Records of the County of Santa Clara which prohibits the use of on-site shallow groundwater as drinking water and restricts subsurface activity that might mobilize contaminants or create a

complete exposure pathway. The restrictive easement must remain in place until soil and groundwater cleanup standards are achieved.

An Explanation of Significant Difference (ESD) was issued on September 13, 2002. The ESD modified three elements of the remedy selected in the ROD. These modifications included:

1. Groundwater treatment was modified to use an air stripper in combination with vapor-phase carbon absorption rather than liquid-phase carbon absorption. The change in treatment technologies was required to meet new, more stringent discharge requirements. Under the ROD, treated groundwater was discharged to the sanitary sewer system under a permit with the City of Mountain View. As part of the facility closure plan process with the City, the publicly-owned treatment works permit Jasco operated under was not renewed. Treated groundwater was discharged to surface water (Permanente Creek) under a General NPDES permit with the Regional Water Quality Control Board (RWQCB). To meet the new discharge requirement, the treatment system needed to be modified to treat contaminants to the State maximumcontaminants levels (MCLs).

2. Soil treatment in the drainage swale area at the rear of the Site was modified to allow *in situ* soil vapor extraction (SVE) rather than *ex situ* enhanced bioremediation. This modification was required by the change in ownership of the adjacent rail line. Under the ownership of the Joint Powers Board, rules for working near commuter rail lines changed that made excavation difficult.

3. The deed restriction would remain in place in order to eliminate the potential for exposure to chemical vapors during future construction activities at the Site and to ensure that the underlying groundwater would not be disturbed. The ESD required that the restriction be recorded as an Environmental Restriction under Section 1471 of the California Civil Code and run with the land.

A second ESD was issued on September 26, 2012, clarifying one of the modifications to the ROD explained in the 2002 ESD pertaining to the deed restriction. Given that the deed restriction addressed impacts from a PCE plume originating from an off-site source (which is not part of the Jasco site) and cleanup of site related contaminants was complete, the ESD clarified that the deed restriction is no longer a component of the remedy for the Site.

The Remedial Action at the Jasco Site began in the winter of 1994 with EPA approval for the installation of a pilot scale dual vacuum extraction/ soil vapor extraction (DVE/SVE) system for the drainage swale area of the Site. The purpose of the pilot test was to evaluate DVE/SVE as a remedy for the cleanup of soil and groundwater and it began operating in 1995. The system operated successfully until February 1998. The restrictive easement was recorded on April 19, 1993, which prohibited the use of groundwater until clean up levels were acheived.

In April 1997, Jasco voluntarily converted a monitoring well to a dual vacuum extraction (DVE) well in response to the appearance of PCE in groundwater near the southeastern corner of the warehouse

facility. Jasco subsequently converted an additional monitoring well to DVE in order to remove PCE from a perched groundwater zone and prevent further PCE migration. These converted DVE wells remained in operation until April 1998 when the expanded groundwater extraction and treatment system was completed.

Jasco reached construction completion on September 20, 2002. A preliminary closeout report (PCOR) documented that the construction of the cleanup remedy was complete.

An environmental covenant to restrict use of the property was recorded March 20, 2010 which prohibits drilling of wells into and/or extraction of groundwater for any use other than remediation or monitoring, and prohibits soil disturbance without prior approval by the EPA and the RWQCB of mitigative measures.

Although the off-site source of elevated PCE and its degradation product TCE in groundwater have not been fully investigated to date, EPA and California RWQCB are in agreement that groundwater contaminant and hydraulic data support the conclusion that this contamination is not the result of past activities at the Jasco Site. While not a component of the Site remedy, this issue is further discussed in Section 6.4.

4.2. Operation and Maintenance (O&M)

The groundwater extraction and treatment system was shut off and has not been in operation since March 2002. Also, the soil vapor extraction and treatment system to treat drainage swale soil contamination was shut off and has not been in operation since February 1998. Since there was no active treatment system on Site in operation during the period of this Five Year Review, no system performance or operation and maintenance data were available for evaluation.

5. Progress Since the Last Five-Year Review

5.1. Previous Five-Year Review Protectiveness Statement and Issues

The protectiveness statement from the 2007 FYR for the Jasco Chemical Company Site stated the following:

> The overall remedy at the Jasco Chemical Superfund Site for both soil and groundwater is considered protective in the short-term of human health and the environment since there is no evidence of a complete exposure pathway. The remedy is expected to continue to be protective for the foreseeable future. The Institutional Control needs to be recorded with Santa Clara County and must remain in place until the off-site PCE plume is delineated and addressed.

The 2007 FYR included three issues and recommendations (Table 3). Each recommendation and the

current status are discussed below.

Table 3. Status of Recommendations from the 2007 FYR

Issues from previous FYR	Recommendations	Party Responsible	Milestone Date	Action Taken and Outcome	Date of Action
Deed restrictions	Ensure that the appropriate deed restriction has been recorded with the County Clerk's office	Harry M. & Carol Jean Anthony (current property owners)	3/31/2008	Covenant and Environmental Restriction on Property issued for parcel	3/29/2010
PCE in groundwater	Work with State and other interested parties to investigate extent of plume	EPA	9/30/2008	Since PCE plume source is off-site, EPA is referring to State for plume characterization	8/24/2012
PCE Vapor Intrusion	Sample soil gas near residences to confirm no risk from vapor intrusion	EPA	9/30/2008	Since PCE plume source is off-site, EPA is referring to State for further investigation. No sampling was done and mitigation for vapor intrusion addressed in deed restriction.	8/24/2012

To date, the off-site plume has not been fully investigated.

5.2. Work Completed at the Site During the Review Period

Activity at the Site during the last FYR period has been limited to groundwater monitoring. Four quarters of groundwater data were collected in 2007 (January, April, July and November), followed by an EPA-approved reduction in routine groundwater monitoring from quarterly to annual documented in January 2008. Since that time, annual monitoring events were conducted in April 2008, May 2009, and April 2010. EPA approval to discontinue Site groundwater monitoring occurred in March 2011.

6. Five-Year Review Process

6.1. Administrative Components

EPA Region 9 initiated the planning phase of the FYR in May 2011, including initial coordination with USACE, and scheduled its completion for September, 2012. The EPA FYR team was led by Alison Fong, US EPA Remedial Project Manager (RPM) for the Jasco Chemical Company Site, and included the EPA site attorney and staff from USACE. USACE technical team members included Heather Whitney (chemist), Ellen Engberg (geologist), Jeff Powers (hydrogeologist), Deborah Johnston (biologist), and Diane Jordan (real estate specialist). In January 2012, EPA held a scoping call with the technical review team to discuss the Site and items of interest as they related to the protectiveness of the remedy currently in place. A review schedule was established that consisted of the following:

- Community notification;
- Document review;
- Data collection and review;
- Site inspection;
- Local interviews; and
- Five-Year Review Report development and review.

6.2. Community Involvement

On June 29, 2012, a public notice was published in the *Mountain View Voice* announcing the commencement of the Five-Year Review process for the Jasco Site, providing contact information, and inviting community participation. The press notice is available in Appendix B. No one contacted EPA as a result of this advertisement.

The Five-Year Review report will be made available to the public once it has been finalized. Copies of this document will be placed in the designated public repository at the Mountain View Public Library.

6.3. Document Review

This FYR included a review of relevant, site-related documents including the ROD, ESDs, remedial action reports, Expert Technical Assistance Report, and recent monitoring data. A complete list of the documents reviewed can be found in Appendix A.

6.3.1. ARARs Review

Section 121 (d)(2)(A) of CERCLA specifies that Superfund RAs must meet any federal standards, requirements, criteria, or limitations that are determined to be applicable or relevant and appropriate

requirements (ARARs). ARARs are those standards, criteria, or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, RA, location, or other circumstance at a CERCLA site.

Since the ROD, the majority of the ARARs have remained unchanged except as noted in Table 5.

Changes in chemical-specific ARARs since the last FYR are summarized in Table 4. As discussed in the first FYR (USEPA, 2007), the State of California did not have promulgated Maximum Contaminant Levels (MCLs) for Pentachlorophenol (PCP), Methylene chloride, Tetrachloroethylene (PCE), and 1,1,1-Trichloroethane (1,1,1-TCA) at the time the original ROD was finalized (September 30, 1992).

The state MCLs for Ethylbenzene, Toluene, and Trichloroethene (TCE) have changed since the ROD. The state MCL for Ethylbenzene was lowered from 0.68 mg/L to 0.3 mg/L. The cleanup goal for the Site, as described in the ROD, is the more stringent federal or state drinking water standard. At the time that the ROD was signed, the State standard was slightly more stringent at 0.68 mg/L than the Federal standard of 0.7 mg/L. If the ROD were finalized today, the cleanup goal for Ethylbenzene would be 0.3 mg/L rather than 0.68 mg/L.

The state MCL for Toluene has been raised from 0.005 mg/L to 0.15 mg/L, which is still lower than the (unchanged) federal MCL of 1 mg/L. However, even though the state MCL at the time of the ROD was lower than the federal MCL, the federal MCL of 1 mg/L was selected as the clean up goal for the Site. The ROD did not discuss the reasoning behind the selection of the higher federal MCL for Toluene instead of the lower state MCL.

The State MCL for TCE was lowered from 0.2 mg/L to 0.005 mg/L, which matches both the federal MCL and the ROD clean up level. In September 2011, EPA released the final TCE health assessment; however, the federal MCL for TCE currently remains unchanged. In February 2012, EPA also released new toxicity values for Tetrachloroethylene (PCE), but the federal MCL for PCE also remains unchanged. The impact of the above changes on the protectiveness question will be addressed in the evaluation of risk assessment and toxicology issues.

The ROD cleanup standards for soil are health-based. They consider risks associated with dermal contact, ingestion, and inhalation of Site soils. In addition, they consider protection for the beneficial uses of the groundwater as a potential drinking water source. The standards are site-specific values that were developed upon review of the original baseline risk assessment. Thus, there are no readily-available standard soil cleanup values against which the original standards can be compared. Instead, existing soil data can be compared to EPA Regional Screening Levels (RSLs) for residential soil exposure. A comparison of cleanup standards and existing soil data against the RSLs is addressed in the evaluation of risk assessment and toxicology issues (Section 6.3.2).

Table 4. Summary of Ground Water ARAR Changes

Contaminants of Concern	1992 ROD ARARs[1]		MCLs at time of ROD		Current Regulations		
	Groundwater (mg/L)	Soil (mg/kg)	Federal (mg/L)	State (mg/L)	Federal MCL (mg/L)	State MCLs (mg/L)	Have changes occurred since the last Five Year Review
Acetone	4	30	NA	NA	NA	NA	No
Benzene	0.001	0.3	0.005	0.001	0.005	0.001	No
Chloroethane	30	4000	NA	NA	NA	NA	No
1,1-Dichloroethane (1,1-DCA)	0.005	0.6	NA	0.005	NA	0.005	No
1,1-Dichloroethene (1,1-DCE)	0.006	2	0.007	not in ROD	0.007	0.006	No
1,2-Dichloroethane (1,2-DCA)	0.0005	0.03	0.005	0.0005	0.005	0.0005	No
1,2-Dichloroethene (1,2-DCE)	0.006	1	0.07	0.006	0.07	0.006	No
Diesel or Kerosene Mixture	3	10000	NA	NA	NA	NA	No
Ethylbenzene	0.68	3000	0.7	0.68	0.7	**0.3**	Yes; State revision is more stringent.
Methanol	20	200	NA	NA	NA	NA	No
Methyl Ethyl Ketone	0.6	9	NA	NA	NA	NA	No
Methylene Chloride	0.005	0.2	0.005	NA	0.005	**0.005**	No
Pentachlorophenol	0.001	200	0.001	NA	0.001	**0.001**	No
Tetrachloroethene (PCE)	0.005	7	0.005	NA	0.005	**0.005**	No
Toluene	1	1000	1	0.005	1	**0.15**	Yes; State revision is more stringent, but federal MCL was selected in ROD.
1,1,1-Trichloroethane (1,1,1-TCA)	0.2	100	0.2	NA	0.2	**0.2**	No
Trichloroethene (TCE)	0.005	3	0.005	0.2	0.005	**0.005**	Yes. State revision now matches federal MCL.
Vinyl Chloride	0.0005	0.02	0.002	0.0005	0.002	0.0005	No
Xylenes	1.75	2000	10	1.75	10	1.75	No

The groundwater extraction and treatment system was shut off and has not been in operation since March 2002. Therefore the ARARs for the water treatment and solid waste/hazardous waste control may no longer be relevant.

Table 5. Applicable or Relevant and Appropriate Requirements Evaluation

Requirement	Citation	Document	Description	Effect on Protectiveness	Comments
Federal Drinking Water Standards	Section 1412 of the Safe Drinking Water Act (SDWA), 42 United States Code (USC) § 300f-1, "National Drinking Water Regulations"; National Primary Drinking Water Regulations, 40 CFR Part 141	1992 ROD	40 CFR Part 141 establishes federal MCLs that were used to establish groundwater cleanup levels.	Revisions do not affect Protectiveness.	Since the 1992 ROD, there has been one revision to 40 CFR Part 141.61 MCLs for organic contaminant (59 FR 34324, July 1, 1994). This revision did not affect any of the contaminants selected for clean up levels in the ROD.
State Drinking Water Standards	California Safe Drinking Water Act, Health & Safety Code, Div. 5, Part 1, Chapter 7, § 4010 et seq., California Domestic Water Quality Monitoring Regulations, CAC Title 22, Division 4, Chapter 15, §64401 et seq.	1992 ROD	Establishes state MCLs that were used to establish groundwater cleanup levels.	Revisions do not affect protectiveness.	State standards for Methylene chloride, PCP, PCE, and 1,1,1-TCA were promulgated. State MCLs for Ethylbenzene and TCE were lowered to 0.3 and 0.005 mg/L, respectively. State MCL for Toluene was raised from 0.005 to 0.15 mg/L.
Treatment by Liquid Phase Carbon Adsorption	Solid Waste Disposal Act, as amended by Resource Conservation and Recovery Act, 42 USC §6901 et seq.	1992 ROD	Use of granular activated carbon for remediation of VOCs triggers requirements associated with regeneration or disposal, storage, and handling of spent carbon.	Any revisions would not affect protectiveness since treatment has ceased.	The groundwater extraction and treatment system was shut off and has not been in operation since March 2002.
Handling and Storage of Hazardous Waste	RCRA and Hazardous Solid Waste Amendment (HSWA) Standards (42 USC §6901-6987)	1992 ROD	Remedial activities involving excavation of removal of hazardous wastes, on-site management of hazardous wastes or removal to off-site facilities must be in compliance with Federal and State regulations.	Any revision would not affect protectiveness since treatment has ceased.	The groundwater extraction and treatment system was shut off and has not been in operation since March 2002.

Requirement	Citation	Document	Description	Effect on Protectiveness	Comments
	California Hazardous Waste Control Laws (Health & Safety Code, Div. 20, Chapter 6.5, Articles 2, 4, 4.5, 5, 6, 6.5 and 7)	1992 ROD	State of California standards governing hazardous waste control, management of hazardous waste facilities, transporation of hazardous wastes, and classification of hazardous waste.	Any revisions would not affect protectiveness since treatment has ceased.	The groundwater extraction and treatment system was shut off and has not been in operation since March 2002.
Underground Storage Tank Requirements	California Health & Safety Section25280 et seq. and 23 CCR Sections 2670-2672	1992 ROD	State regulations governing underground storage tank monitoring, repair, releases, and closures.	Any revisions would not affect protectiveness since USTs are no longer being used.	Site operation has ceased.
Air Emissions	Clean Air Act, 42 USC §7401 et seq. and Bay Area Air Quality Management District Regulation 8, Rule 5, 40, and 47.	1992 ROD	Regulates air emissions to protect human health and the environment associated with the storage of organic liquids, aeration of contaminated soil, removal of underground storage tanks, air stripping and groundwater aeration.	Any revisions would not affect protectiveness since treatment has ceased.	The groundwater extraction and treatment system was shut off and has not been in operation since March 2002.
Liquid Discharges	Clean Water Act (CWA) Section 402 National Permit Discharge Elimination System (NPDES) Requirements (40 CFR 122)	2002 ESD (not identified in ROD)	Governs discharge of treated groundwater. Requires treatment to CWA water quality standards, based on the beneficial use of the receiver water.	Any revisions would not affect protectiveness since treatment and surface discharge has ceased.	Discharge from the treatment plant was regulated under a general NPDES permit administered by the Regionl Water Quality Control Board (RWQCB). The groundwater extraction and treatment system was shut off and has not been in operation since March 2002. Liquid waste is no longer generated or being discharged.

6.3.2. Risk Assessment Review

A Baseline Risk Assessment (BRA) dated August 1989 was prepared by Jacobs Engineering under contract to EPA, of which a summary of the findings was included in the ROD (Jacobs Engineering 1989). The risk assessment identified current exposure pathways as ingestion and dermal contact with contaminated soils, inhalations of VOCs and/or fugitive dust, and hypothetical ingestion, inhalation, and dermal contact with contaminated groundwater.

The risk assessment identified the exposure pathways and best-estimate associated risks listed in Table 6.

Table 6. Summary of Risk Assessment for the ROD

Exposure Scenario & Pathway	Risk Driver(s)	Risk Estimate
Groundwater Ingestion	Adult resident	Chronic NC: 3.2 Subchronic NC: 3.3 Cancer: 3.6E-3
Groundwater Ingestion	Children	Subchronic NC: 8.0
Inhalation of Vapors while showering	Adult Resident	Chronic NC: 0.012 Subchronic NC: 1.2 Cancer: 2.7E-4
Soil Ingestion	Adult Resident	Chronic NC: 8.4E-4 Subchronic NC: 1.4E-4 Cancer: 7.3E-7
Soil Ingestion	Child Resident	Subchronic NC: 1.8E-4
Soil Ingestion	Construction Worker	Subchronic NC: 2.0E-3
Particulate Inhalation	Adult Resident	Chronic NC: 4.0E-7 Subchronic NC: 6.5E-7 Cancer: 6.5E-9
Particulate Inhalation	Children	Subchronic NC: 2.6E-6
Particulate Inhalation	Construction Workers	Subchronic NC: 1.7E-6

C – Cancer; NC – Non-cancer

The risk assessment was reviewed to identify any changes in exposure or toxicity that would impact protectiveness. Vapor intrusion was not evaluated as part of the original risk assessment. Selected toxicity values of contaminants of concern (COCs) from EPA's Integrated Risk Information System (IRIS) toxicity assessments have also changed since the ROD (see discussion later).

Groundwater. The current and hypothetical groundwater exposure pathways identified in the ROD are still valid assumptions. The Site remedy specified in the ROD prohibited the use of groundwater for drinking purposes. A restrictive easement recorded in 1993 and the deed restriction enacted in 2010 currently prevents use of groundwater at the Site for drinking purposes and therefore preventing exposure to, and the ingestion of, groundwater.

The Site is currently under consideration for deletion from the NPL. Current groundwater data (as of April 2010) show that TCE concentrations are either less than or very close to the cleanup standard of 5 ug/L. The maximum detection of PCE was 190 ug/L, which exceeds the cleanup standard of 5 ug/L. However, the PCE and, its breakdown product, TCE, detections in groundwater is due to an off-site source and not to on-site contamination. Thus, future developments would need to be connected to city

water to prevent potential exposure to occupants. The presence of TCE, PCE, and other constituents in relation to their cleanup standards is discussed in more detail in section 6.4.2 (Data Review).

Soil. The soil exposure pathway was only evaluated in the BRA in terms of potential soil disturbance (Table 6); these pathway assumptions remain valid. Currently, the Site is vegetated and fenced, so the soil exposure pathways are incomplete. Remaining concentrations of target constituents in soil taken from 1996 and 1998 are all below the selected cleanup standard, and except for a few PCP detections, concentrations are also below the April 2012 EPA RSL for residential soil (USEPA 2012). Samples that contained detections above RSLs were usually only slightly above the RSLs or located at a depth (>10 feet) or location (such as close to the train tracks) that would naturally discourage contact. Additionally, more than 10 years have passed since the soil analysis, and continued natural biodegradation has likely decreased concentrations further. Section 6.4 contains a more detailed discussion of the comparison of existing soil data against EPA RSLs.

Vapor Intrusion. EPA's understanding of contaminant migration from soil gas and/or groundwater into buildings has evolved over the past few years leading to the conclusion that vapor intrusion may have a greater potential for posing risk to human health than assumed when the ROD was prepared. In September 2002, EPA released an external review draft version of its vapor intrusion guidance titled "Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils" (USEPA 2002a).

When an off-site PCE source was first identified to be impacting the Site, neighboring property owners requested a risk assessment evaluation of vapor intrusion of PCE to workers and future residents at the Site (Jones & Stokes, 2003). Although not finalized, the draft vapor pathway risk assessment concluded that the estimated excess cancer risk to potential future residents was in the range of 3.5×10^{-9} to 3.0×10^{-6}, depending on the exposure assumptions and parameters. The risk to construction workers involved in excavation activity was estimated to range between 3.3×10^{-8} and 7.1×10^{-8}.

Following the Remedial Action, soil confirmation sampling indicated that soil concentrations were below the soil cleanup standards (IT Corporation 2002a and see Section 6.4.1). Groundwater concentration of contaminants has also decreased considerably such that concentrations of COCs attributed to the Jasco Site activities at all wells are below the cleanup levels. The exceptions are PCE and TCE which are attributed to an off-site source (ITSI 2011). Given the successful soil removal activity (source control) and low groundwater concentrations of the target constituents released at the Jasco Site by former Jasco Chemical Company activities, the vapor intrusion pathway is likely incomplete or extremely low-risk. If on-site groundwater concentrations of PCE and its daughter product, TCE, as a result of off-site contaminant migration were to increase considerably, vapor intrusion may need to be reevaluated in future use plans.

Toxicity values: EPA's IRIS has a program to update toxicity values used by the Agency in risk assessment when newer scientific information becomes available. In the past five years, there have been a number of changes to the toxicity values for certain contaminants of concern at the Site. (Note: Although cleanup levels for 19 COCs were selected for 1992 ROD, only nine of these chemicals were considered "indicator contaminants" and utilized in the 1989 BRA. However, the ROD includes summary

cancer and non-cancer risk information for all 19 compounds). Table 7 presents the COCs for which revisions to toxicity values occurred since the last FYR. In summary, revisions to the toxicity values for PCP, PCE, TCE indicate a higher risk from exposure to these chemicals than previously considered. Of the remaining COCs in the ROD but not included in the original BRA, revisions to toxicity values for 1,2-DCE and 1,1,1-TCA indicate a lower risk from exposure to these chemicals than previously considered. None of the COCs are currently under review through IRIS.

Table 7. Revisions to toxicity values since the last FYR

Contaminant of Concern	Toxicity Values				Change
	Cancer		Non-Cancer		
	IUR	SFo (1/mg-kg-d)	RfCi	RfDo (mg/kg-d)	
TCE	OLD: 1.3E-2/(mg-kg-day) NEW: 4E-6/μg/m^3	OLD: 1.1E-2 NEW: 4.6E-2	NEW: 0.002 mg/m^3	NEW: 0.0005	Cancer: More stringent Non-Cancer: New
PCE	OLD: 3.3E-3/(mg-kg-day) NEW: 2.6E-7/μg/m^3	OLD: 5.1E-2 NEW: 2.1E-3	NEW: 0.04 mg/m^3	OLD: 1.0E-2 NEW: 0.006	Cancer: Less stringent Non-Cancer: More stringent
PCP	No change.	OLD: 1.6E-2 NEW: 4E-1	No change.	OLD: 3E-2 NEW: 5E-3	Cancer: More stringent Non-Cancer: More stringent
Cis-1,2-DCE[1]	No change.	No change.	No change.	OLD: 0.01 NEW: 0.002	Non-Cancer: More stringent
1,1,1-TCA[1]	No change.	No change.	OLD: 6.3 E-1 mg/kg-day NEW: 5.0 mg/mg^3	OLD: 2.8E-01 NEW: 2.0	Non-Cancer: Less stringent

[1] 1,2-DCE and 1,1,1-TCA were included in the ROD risk assessment summary but not included in the 1989 BRA. Because old toxicity values were available in the BRA but not the ROD, the old toxicity values presented here are from 2004 EPA Region 9 preliminary remedial goals. IUR – Inhalation Unit Risk; RfCi – Inhalation Reference Concentration; RfDo – (oral) Reference Dose; SFo – Oral Slope Factor.

In September 2011, EPA completed a review of the TCE toxicity literature and posted on IRIS both cancer and non-cancer toxicity values which resulted in lower RSLs for TCE. The screening level for chronic exposure for cancer excess risk level of $1x10^{-6}$ is 0.44 μg/L. EPA uses an excess cancer risk range between 10^{-4} and 10^{-6} for assessing potential exposures, which means a TCE concentration between 0.44 and 44 μg/L. The current Maximum Contaminant Level (MCL) for TCE of 5 μg/L is within the revised protective carcinogenic risk range. EPA's 2011 Toxicological Review for TCE also developed safe levels that include at least a 10 fold margin of safety for health effects other than cancer. Any concentration below the non-cancer RSL indicates that no adverse health effect from exposure is expected. Concentrations significantly above the RSL may indicate an increased potential of non-cancer effects. The non-cancer screening level for TCE is 2.6 μg/L. EPA considers the TCE MCL of 5 μg/L protective for both cancer and non-cancer effects.

EPA also recently reassessed PCE toxicity literature for both cancer and non-cancer effects and released the toxicological review in February 2012, posted on IRIS. The reassessment determined that risk for cancer excess of $1x10^{-6}$ was less stringent than previously assumed, and has raised the cancer RSL for PCE to 9.7 µg/L. The non-cancer RSL was also revised based on adverse neurological effects and resulted in a non-cancer risk RSL of 35 µg/L. The PCE MCL of 5 µg/L remains protective for both carcinogenic and non-cancer effects.

Since the last FYR, PCP also has an increased cancer risk than previously assumed, resulting in a tapwater multi-pathway cancer RSL of 0.17 ug/L, which is now below the ROD cleanup level of 1 ug/L. However, the ROD cleanup level is still within an excess cancer risk range between 10^{-4} and 10^{-6}, which equates to a PCP concentration of 0.17 and 17 ug/L. Both PCP and cis-1,2-DCE also have more stringent non-cancer toxicity values; however, these non-cancer changes do not affect protectiveness since the cancer RSLs are lower. Non-cancer toxicity values for 1,1,1-TCA increased indicating that this compound is less toxic than previously considered; therefore, this change does not impact the protectiveness of the remedy. The MCLs for PCP, cis-1,2-DCE, and 1,1,1-TCA are thus still protective. Section 6.4.2 provides a detailed analysis and comparison of groundwater data against MCLs.

Table 8 illustrates the impact of toxicity value revisions via a comparison of April 2012 EPA tapwater multi-pathway RSLs with ROD cleanup standards for contaminants of concern that now have more stringent toxicity values since the last Five Year Review (PCE, TCE, PCP, and cis-1,2-DCE). In summary, the RSLs are below current MCLs for PCE, TCE, and PCP, indicating that the cleanup level is greater than the $1x10^{-6}$ cancer risk level. The ROD cleanup level for cis-1,2-DCE is still protective since it is less than the multipathway tapwater RSL. (Note: cis-1,2-DCE and PCP concentrations are non-detect.)

From a relative risk contribution standpoint, the cancer risk in the ROD posed by on-site contaminated groundwater was primarily attributed to 1,2-Dichloroethane (1,2-DCA) and methylene chloride (relative cancer contributions of 31.80 and 54.67% respectively). Together, PCE, PCP, and TCE contributed less than 1% of the relative cancer risks posed by on-site contaminated groundwater (ROD Table 6.2). Methylene chloride was the main contributor to non-cancer risk posed by on-site groundwater at 93.39% whereas PCP, PCE, and TCE accounted for less than 1%.

Table 8. Comparison of ROD Cleanup Levels against April 2012 EPA RSLs.

Contaminant of Concern	ROD Cleanup Level (ug/L)	Current MCL (ug/L)	Tapwater multipathway cancer RSL (ug/L)	Tapwater multipathway non-cancer RSL (ug/L)	RSL < ROD Cleanup Level?
Pentachlorophenol (PCP)	1	1	**0.17**	78	Yes
Tetrachloroethylene (PCE)	5	5	9.7	84	No
Trichloroethylene (TCE)	5	5	**0.44**	**2.6**	Yes
Cis-1,2-dichloroethylene (cis-1,2,-DCE)	6	70	--	28	No

Notes - EPA RSLs updated April 2012. Bolded values are less than the ROD cleanup levels.

Similarly, for risk posed by on-site soils based on potential contaminant migration to groundwater, methylene chloride was identified as the main contributor to both cancer (89.81%) and non-cancer (84.84%) risks (ROD, Table 6.3). PCP, PCE, and TCE together accounted for less than 3% and 1% of the relative cancer and non-cancer risks, respectively.

Considering the relatively small calculated contribution of PCP, PCE, and TCE to the cancer and non-cancer risks posed by soil and groundwater as presented in the ROD, the increased toxicity of these compounds will not significantly affect the overall risk calculation. The two main risk driver chemicals identified in the BRA and ROD, 1,2-DCA and methylene chloride, were not detected in any wells during the latest (April 2010) sampling event.

6.3.3. Ecological Risk Assessment Review

The Jasco Site is bordered on the north by the main line right-of-way of the Southern Pacific Railroad and the Central Express roadway. The property to the east of the Site is an apartment complex, Villa Mariposa. The Site is at an approximate elevation of 60 feet above mean sea level with local topography that slopes gently to the north-northeast. Permanente Creek is the only water body near the Site, located about 600 feet northwest of the Site (away from the surface water flow direction). The creek is a perennial, concrete lined channel used primarily for drainage and flood control that flows north northwest into San Francisco Bay. The drainage swale (immediately north of the Site) lay in the railroad right-of-way and collected surface water drainage from both the northern part of the Jasco Site as well as from the Site to the east and the railroad right-of-way; drainage followed the gentle surface slope to the northwest (parallel to the railroad).

As part of the facility closure plan process with the City of Mountain View, the publicly-owned treatment works permit Jasco operated under was not renewed. Treated groundwater was therefore discharged to surface water (Permanente Creek) under a General NPDES permit with the Regional Water Quality Control Board. Subsequently, the groundwater extraction and treatment system shut-off inMarch 2002, since the original target contaminants were remediated to below cleanup standards and therefore no treated groundwater enters Permanente Creek.

The fenced Site consists of mowed ruderal grasses with eucalyptus and conifer trees along the property boundaries and a small patch of trees in the center of the Site. Both the railroad and Central Expressway are heavily utilized on the northside with apartment buildings to the east and residential areas to the west. Wildlife usage would be those species typically found in an urban environment (primarily birds since the Site is fenced reducing the ability of opossums and coyotes to enter the Site). The Site is of low wildlife value, the groundwater flow is toward the north, cross-gradient to Permanente Creek, and the remedy is protective of the environmental constituents.

6.4. Data Review

6.4.1. Soil

Soil was an original medium of concern for the Site. Site soil contamination originated from the handling and storage of numerous chemicals associated with chemical repackaging and formulation that occurred on site. The soil component of the Site remedy, as stated in the ROD, was to treat all site soils containing chemical concentrations greater than the cleanup standards with the enhanced biotreatment method and off-site disposal of site soils containing residual concentrations greater than the soil cleanup standards after biological treatment was completed. Because soils close to the railroad could not be excavated, the 2002 ESD amended the soil treatment to use a soil vapor extraction (SVE) system in the drainage swale area at the rear of the site instead. The DVE/SVE system operated until 1998, when it was replaced by an expanded groundwater extraction and treatment system. The Drainage Swale Area 1 was subsequently re-sampled in 2002 to ensure that methylene chloride and other VOCs were below the soil cleanup standards (IT Corporation, 2002).

As part of this FYR, the existing soil data and ROD soil cleanup levels were re-evaluated against current (April 2012) EPA residential soil multi-pathway (ingestion, inhalation, and dermal contact) RSLs to confirm that the remaining soil concentrations following the Remedial Action are still protective of human health.

All soil data analyzed as part of this FYR were obtained from reviews of the following documents:

- 2002 Revised Final Remedial Action Report (IT Corporation 2002)
- 2006 Technical Memorandum: Reevaluation of Soil Analytical Data Against EPA 2004 Preliminary Remediation Goals (Shaw, 2006a)

The 2002 Revised Final Remedial Action Report for Soil analyzed the soil data from investigation and sampling conducted between 1995 and 2002 (IT Corporation 2002), concluding that the Jasco Site met all cleanup standards for the target constituents in soil. The 1995-1998 soil data presented in the Final RA Report for Soil was again reevaluated in the 2006 Technical Memorandum for comparison against the 2004 EPA Region 9 residential soil Preliminary Remediation Goals (PRGs) for direct contact (dermal exposure), to ensure that there were no soil sample locations on the Jasco Site that would result in an unacceptable risk for dermal exposure (Shaw, 2006).

The latest available EPA RSLs used in this comparison were updated April 2012 and included toxicity changes to TCE. The RSLs and ROD soil cleanup standards are shown in Table 9. Items in bold indicate an RSL that is less than the ROD soil cleanup standard.

Table 9. Cleanup Standards for Target Constituents in Soil

Target Constituent	ROD Soil Cleanup Standard (mg/kg)	April 2012 EPA RSLs, Residential Soil, all pathways (mg/kg)	
		Cancer	Non-Cancer
Acetone	30	--	61,000
Benzene	0.3	1.1	86
Chloroethane	4000	--	15,000
1,1-Dichloroethane (1,1-DCA)	0.6	3.3	16,000
1,1-Dichloroethene (1,1-DCE)	2	--	240
1,2-Dichloroethane (1,2-DCA)	0.03	0.43	33
1,2-Dichloroethene (cis-1,2-DCE)	1	--	160
Diesel or Kerosene Mixture	10000	None specified	None specified
Ethylbenzene	3000	**5.4**	3,500
Methanol	200	--	31,000
Methyl Ethyl Ketone	9	--	28,000
Methylene Chloride	0.2	56	360
Pentachlorophenol (PCP)	200	**0.89**	230
Tetrachloroethylene (PCE)	7	22	86
Toluene	1000	--	5,000
1,1,1-Trichloroethane (1,1,1-TCA)	100	--	8,700
Trichloroethene (TCE)	3	**0.91**	4.4
Vinyl Chloride	0.02	0.06	74
Xylenes	2000	**--**	**630**

The April 2012 RSLs are higher than the ROD-specified soil cleanup standards with the exception of four target constituents: ethylbenzene, pentachlorophenol (PCP), trichloroethylene (TCE), and xylenes (bolded in Table 9). For PCP and TCE, the ROD soil cleanup level is still within EPA's acceptable excess cancer risk range. The ROD cleanup level for ethylbenzene is not within the acceptable excess cancer risk range. The RSL for xylenes is a non-cancer value and thus has no acceptable range.

RSLs for ethylbenzene, PCP, TCE, and xylenes were compared against the analytical soil data taken in 1995-1998 and subsequently presented in Technical Memoranda organized by sampling location/event (IT Corporation, 2002; Shaw, 2006a; Shaw, 2006b). Appendix A of the 2006 Tech Memo includes multiple tables organized by location/event that detail sample IDs, sampling dates, depth of samples, and measured concentrations. Measured soil concentrations and reporting limits that exceed the April 2012 RSLs were identified and are presented in Table 10 (exceedances in **bold**). In the scenario in which no measured concentrations exceeded the RSL for a location, the highest measured concentration or reporting limit is shown.

Table 10. Comparison of soil analytical results again multi-pathway residential soil RSLs for COCs with soil cleanup standards that exceed RSLs.

Standards/Screening Levels			Contaminant of Concern[2] (mg/kg)			
			Ethylbenzene	PCP	TCE	Xylenes
ROD Soil Cleanup Standard			3000	200	3	2000
April 2012 EPA RSLs, Residential Soil Multi-pathway			5.4	0.89	0.91	630
Sampling Location/Event[1]	**Year Sampled**	**Number of Samples**	**Measured Concentrations and Non-Detects that exceed RSL by Location**			
UST Excavation Verification Samples	1996	21	0.0066U	**3.1U**	0.0066U	0.0066U
UST Soil Stockpiles	1996	11	0.026U	**4.1, 2.9U, 5.8U, 28U, 260,**	0.026U	0.026U
Bioremediation Soil Pile Confirmation	1998	3	0.005U	**4, 3.2, 4.5**	0.005U	0.010U
Warehouse Area	1996	52	0.100U	0.50U	0.100U	0.100U
Production Area	1996	35	0.1U	0.5U	0.100U	0.1U
Drum Storage Area	1996	26	0.0062U	**1.1, 0.93, 1.8, 2.7, 1.8**	0.0062U	0.0062U
Truck Turnaround Area	1996	31	0.0078U	**65U, 2.9U, 3.0U**	0.0078U	0.0078U
Interior Driveway Area	1996	46	0.0068U	**6.1U, 6.2U, 3.0U, 6.0U, 6.2U, 3.0U, 3.0U**	0.0065U	0.0068U
Former Diesel Tank Area	1996	6	0.0062U	No results	0.0062U	0.0062U
Drainage Swale Area 1	1995	23	2.0U	**4.9, 0.97, 2.6, 4.4, 5.0U**	**2.0U**	2.0U
Drainage Swale Area 2	1996	3	0.0063U	0.0063U	0.0063U	0.0063U
Soil Samples Collected during PCE Groundwater Investigation	1997	25	0.0069U	No results	0.068U	0.013U

Notes: 1 – Sampling locations/events data from 1995-1998 is presented in IT Corporation, 2002 and again in Shaw, 2006a. 2 – Only target constitutents with soil cleanup standards less than the most recent (April 2012) RSLs were evaluated. **Bolded** values exceed the associated RSL for that contaminant. All units are mg/kg.

Ethylbenzene, TCE, and xylenes were not detected in any of the locations or sampling events, and except for one TCE sample in Drainage Swale Area 1, their reporting limits were all below their respective RSLs. Therefore, ethylbenzene, xylene, and TCE are not discussed further as there were no measured concentrations above the residential soil RSLs.

Of the twelve locations/sampling events in Table 10, PCP had measured sample concentrations or reporting limits that exceed the RSL in seven locations/sampling events. The locations/sampling events with PCP concentrations exceeding the RSL exceedance are discussed in more detail below.

UST Excavation Verification Samples – PCP was not detected in any of the 21 confirmation soil samples collected. The reporting limits were all below the RSLs, with one exception. PCP was reported as detected in bottom sample UST-B-176 at 3.1 mg/kg.

UST Soil Stockpiles – PCP was detected in two samples at concentrations of 260 and 4 mg/kg. The stockpile with the sample concentration of 260 mg/kg, which is above the ROD cleanup standard of 200 mg/kg, was subsequently remediated using enhanced bioremediation to reduce PCP concentrations to below the ROD cleanup standard. The stockpile containing the sample with a PCP concentration of 4.1 mg/kg, which is above the 0.89 mg/kg residential RSL, was not remediated since it did not exceed the ROD cleanup standard. All soil stockpiles (10 of 11) that did not contain concentrations of target constituents exceeding the ROD cleanup standards were used to backfill the excavation. Since the clean stockpiles did not contain enough soil to complete the backfill due to the displaced volume of the former tanks, clean fill and crushed rock/pea gravel was imported and placed above the stockpile soil. Therefore, any remaining PCP soil contamination associated is likely buried beneath the clean fill. According to a 2002 California Office of Environmental Health Hazard Assessment (OEHHA) in 2000, PCP has been shown to be only moderately persistent in the soil environment, with a reported half-life in an aerobic unacclimated environment of 23 to 178 days (OEHHA, 2000). Given the length of time (14 years) since this sampling occurred, the concentration of PCP has likely decreased since the sampling occurred in 1996. Three other stockpile samples did not contain detected concentrations of PCP; however, the reporting limits (2.9, 5.8, and 28 mg/kg) were above the RSL (0.89 mg/kg).

Bioremediation Soil Pile Confirmation – One stockpile with a sample concentration of 260 mg/kg was not used as backfill material and was treated on-site using enhanced bioremediation to reduce PCP concentration to below the ROD cleanup standard. At the end of treatment in 1998, three confirmation soil samples were collected. PCP was detected in all three samples at concentrations of 4, 3.2, and 4.5 mg/kg, which is well below the cleanup standard but above the RSL of 0.89 mg/kg. The bioremediated soil was then spread near the rear of the warehouse in June of 2002. PCP is considered to be only moderately persistent in the soil environment, and as such, the concentrations of PCP today are likely much lower due to 14 years of degradation and bioremediation that has occurred.

Drum Storage Area – Five of 26 samples had measured PCP concentrations slightly exceeding the RSL (0.89 mg/kg) but far below the ROD cleanup standard. The concentrations and sample depth of these five samples ranged from 0.93 to 2.7 mg/kg and from 1 to 6 feet bgs, respectively. Given the relatively low soil concentration near the RSL and time that has elapsed since the sampling in 1996 (16 years), the concentrations of PCP have likely continued to decrease to near RSL values.

Truck Turnaround Area – PCP was not detected in any of the 31 soil samples; however, the reporting limits of three samples (65, 2.9, and 3.0 mg/kg) were above the RSL (0.89 mg/kg).

Interior Driveway Area – PCP was not detected in any of the 46 soil samples. PCP was reported in four samples as not detected with a reporting limit range of 3.0 to 6.2 mg/kg, roughly six times the 0.89 mg/kg Residential RSL.

Drainage Swale Area 1 – PCP was detected exceeding the RSL in four of 23 soil samples taken in 1995, with concentrations and sampling depth ranging fom 0.97 to 4.9 mg/kg and 10-28 feet bgs. Following the 1995 sampling, the SVE system went into operation at Drainage Swale 1 (DS-1) to ensure that methylene chloride, 1,2-dichloroethane, and vinyl chloride were now below soil cleanup standards. Following SVE

treatment, soil confirmation samples were taken in February 2002; PCP was not analyzed during this sampling event (IT Corporation, 2002), although the SVE operation likely decreased PCP concentrations as well. Given the proximity to the railroad tracks, the depth of the samples that had concentrations exceeding RSLs, and the subsequent SVE applied after the 1995 confirmation samples, it is unlikely that future residents will come in contact with the soil. Additionally, natural degradation since the sampling event in 1995 has likely decreased soil concentrations. One additional sample did not contain a detected concentration of PCP; however, the reporting limit (5.0 mg/kg) is above the RSL (0.89 mg/kg).

All other sampling locations/events: PCP was either not detected nor measured in the remaining five sampling locations/events (Warehouse Area, Production Area, Former Diesel Tank Area, Drainage Swale Area, Soil Samples Collected during PCE Groundwater Investigation) considered in this reevaluation of existing soil data.

Soils Re-evaluation Summary

Reevaluation of existing Site soil data against the November 2011 EPA Residential soil RSLs did not identify any soil sample locations with detected concentrations of ethylbenzene, TCE, or xylenes that exceeded the RSLs.

Reevaluation of PCP concentrations in soil against the 0.89 mg/kg RSL identified the following areas with PCP concentrations that exceeded the RSL:

- Two UST soil stockpiles – One stockpile (with one sample of 260 mg PCP/kg) was bioremediated; the rest (maximum PCP detection of 4.1 mg/kg) were used to backfill the UST site, thus effectively burying any remaining PCP contamination at an unknown depth.

- Drainage swale area 1 – Maximum PCP detection of 4.9 mg/kg; detections were all from samples 10 feet or greater bgs; subsequent SVE treatment and proximity to the rail tracks makes it unlikely that residents will contact the soil.

- Drum Storage area – Maximum PCP detection of 2.7 mg/kg

Continued natural degradation for more than 10 years since the most recent samplings (1998 for the remediated soil) has likely lowered PCP concentrations for all of the above areas. Subsequent SVE treatment and proximity to the rail tracks further decreases the likelihood of contacting contaminated soil at the drainage swale area 1. Additionally, all remaining PCP detections are well within the 10^{-4} to 10^{-6} excess cancer risk range (0.89 to 89 mg/kg) determined acceptable by EPA. Additionally, the subsequent SVE treatment following the 1995 confirmation sampling has likely decreased PCP concentrations in soil. Again, the length of time (>15 years) since the sampling occurred in 1996 (Drum Storage Area) and Drainage Swale Area 1 (1995) would likely mean that concentrations of PCP today are much lower.

Based on the existing data, site soils are unlikely to pose an unacceptable risk to future residential use.

6.4.2. Groundwater

Groundwater data associated with remedial actions implemented based on the ROD (USEPA 1992) and ESD (USEPA 2002), and collected since the last FYR were reviewed and evaluated for the Jasco Site. Previous groundwater monitoring data were included in the review to allow for longer term trends to stand out. No monitoring or sampling of soils has taken place since the last FYR as all cleanup standards had previously been achieved. The groundwater monitoring program was discontinued after the April 2010 monitoring event with approval from EPA.

All data were obtained from document reviews. The following lists are compilations of all project-related documents reviewed in support of the groundwater data assessment:

- Results of Groundwater Monitoring Program and Quarterly Progress Reports covering January 2007, April 2007, July 2007, and November 2007.
- 2008 Annual Groundwater Monitoring Report (July 2008)
- 2009 Annual Groundwater Monitoring Report (May 2009)
- 2010 Annual Groundwater Monitoring Report (June 2010)
- Data from these previous reports were included in plots to show long term trends: Revised PCE Report (December 2000), 2001 Groundwater System Annual Report (January 2002), 2002 Groundwater System Annual Report (January 2003), and quarterly reports from January 2002, April 2002, July 2002, October 2002, January 2003, April 2003, July 2003, October 2003, January 2004, April 2004, July 2004, October 2004, January 2005, April 2005, July 2005, October 2005, January 2006, April 2006, and July 2006.

Groundwater data, both analytical and hydraulic, were reviewed from all on-site monitoring and extraction wells and piezometers for which data was collected. This includes A-aquifer wells ("V" designation) and piezometers ("P" designation): V-1, V-4, V-5, V-6, V-7, V-8, V-9, V-10, V-11, V-12, P-1, P-2, P-3, P-4A, and P-5A. Extraction well EW-6A is no longer in operation.

B-aquifer well data were also reviewed from all on-site B-aquifer wells ("I" designation) and piezometers: I-1, I-2, I-3, P-4B, and P-5B. Note the shallower A- and deeper B-aquifers are local designations; both of these units are considered to be part of the upper aquifer zone of the confined area of the Santa Clara Valley groundwater basin (USEPA 1992). A summary of all Site monitoring wells is included in Table 11, below. Monitoring well locations are shown on Figure 1.

Table 11. Groundwater Monitoring Well Summary

Well ID	Screened Water-Bearing Zone	Well Head Elevation (msl)	Screen Elevation (msl)
V-1	A-aquifer	57.96	29.96-10.96
V-4	A-aquifer	58.32	30.32-23.32
V-5	A-aquifer	58.09	24.59-21.59
V-6	A-aquifer	58.45	20.95-15.75
V-7	A-aquifer	56.36	32.36-20.86
V-8	A-aquifer	57.18	25.18-21.17
V-9	A-aquifer	56.41	33.41-28.41
V-10	A-aquifer	58.99	33.99-26.99
V-11	A-aquifer	59.23	27.73-17.73
V-12	A-aquifer	58.50	27.00-17.00
P-1	A-aquifer	58.89	27.89-17.89
P-2	A-aquifer	59.73	29.23-18.73
P-3	A-aquifer	57.63	25.63-17.63
P-4A	A-aquifer	60.05	34.05-24.05
P-5A	A-aquifer	58.78	32.78-22.78
I-1	B-aquifer	59.02	12.72-1.52
I-2	B-aquifer	57.33	10.33-2.83
I-3	B-aquifer	57.07	10.57-1.07
P-4B	B-aquifer	59.94	17.94-3.44
P-5B	B-aquifer	59.45	16.45-(-)6.05

Notes:
msl – Mean Sea Level

Data Analysis Tools Utilized.

Plots were constructed of concentration versus time for chemicals of concern (COCs) in groundwater at the Jasco Site. The existing Site data were then compared to current cleanup standards for the site-specific COCs. The well data was then tested for the presence of trends. Hydrographs depicting groundwater elevation versus time for each on-site well containing sufficient data were also constructed. Area precipitation was plotted on these graphs to understand the relationship between precipitation, aquifer recharge and water levels in wells.

Time Period of Data.

The trigger for this five year review was the previous FYR signed and dated 28 September, 2007. The previous FYR covered and analyzed data from 2002 to 2007. Groundwater monitoring data from the period of January 2007 to April 2010, when the monitoring program was ended, was included in this review.

Chemicals of Concern Selected for Analysis.

The following constituents were listed as site-specific COCs for both soil and groundwater in the ROD and ESD: acetone, benzene, chloroethane, 1,1-dichloroethane (1,1-DCA), 1,1-dichloroethene (1,1-DCE), 1,2-dichloroethane, cis-1,2-dichloroethene, trans-1,2-dichloroethene, diesel or kerosene mixture,

ethylbenzene, methanol, methyl ethyl ketone, methylene chloride, pentachlorophenol, tetrachloroethene (PCE), toluene, 1,1,1-trichloroethane, trichloroethene (TCE), vinyl chloride (VC), and xylenes.

In the period of the previous FYR, 1,1-DCA, 1,1-DCE, PCE and VC were found to exceed the ROD-specified cleanup standard for groundwater during monitoring in 2002. Since 2002, 1,1-DCA, 1,1-DCE and VC had satisfactorily met cleanup standards.

All analytical data were reviewed; however, only PCE and TCE were found to exceed the ROD-specified cleanup standard for Site groundwater since 2002. The previous FYR determined that, but for the PCE, no other COCs were present in groundwater above cleanup standards by 2007. It was determined that the PCE plume was not related to Jasco activities and contamination, but nonetheless present in the Site groundwater. As the only contaminants present during the period of concern for this FYR, only PCE and TCE have been graphed and presented in Figure 2 through Figure 6.

Handling of Non-Detect and Estimated Concentrations.

For graphical presentation of groundwater data, non-detections were assigned a value of ½ the lowest method detection limit (MDL) for that constituent. Estimated or J-flagged concentrations were assigned the actual estimated value. Use of constant detection limits in the analysis, though not strictly accurate, avoids the introduction of false trends based on non-detectible concentrations. For example, a well with mostly non-detects will therefore yield a "stable" trend based on the analysis, rather than an increasing or decreasing trend based on changes in the MDLs for the samples used in the analysis.

Analytical Data - A-aquifer.

Since January 2007 (Quarter 1), the only COCs which have been present in groundwater above cleanup standards have been PCE and it's break-down product, TCE, at one well. The first quarterly monitoring dataset (January 2007) showed only three locations (V-8, V-9 and V-10) out of nine total locations in the A-aquifer to contain PCE in groundwater above the cleanup standards. No other COCs were present in groundwater above cleanup standards at that time. TCE was detected in wells V-8 and V-10 in the first quarter, but didn't exceed standards (in well V-8 only) until the annual monitoring report of May 2009. This same report details PCE in well V-6 to have also increased to levels above cleanup standards.

PCE has been consistently above the cleanup standard of 5 ug/l in wells V-8, V-9, and V-10. Levels have been relatively stable at V-8 and V-10, and have been increasing at V-9 over time (Figure 2). PCE was initially below 5 ug/l at V-6, but has increased such that the concentration has been in excess of 5 ug/l for the last two readings (May 2009, and Apr 2010) (Figure 2). The PCE level in V-11 has been increasing as well, but has not been detected above the cleanup standard.

TCE has been detected in two A-aquifer wells; V-8 and V-10. Levels appear to be increasing, and have exceeded the cleanup standard of 5 ug/l in well V-8 in the last two data sets (Figure 3). The TCE concentration in well V-10, though elevated, is not above the cleanup standard, and is generally stable (Figure 3). It should be noted that in the two wells where TCE has been detected, PCE has also been detected, and at much higher concentrations (by two to three orders of magnitude).

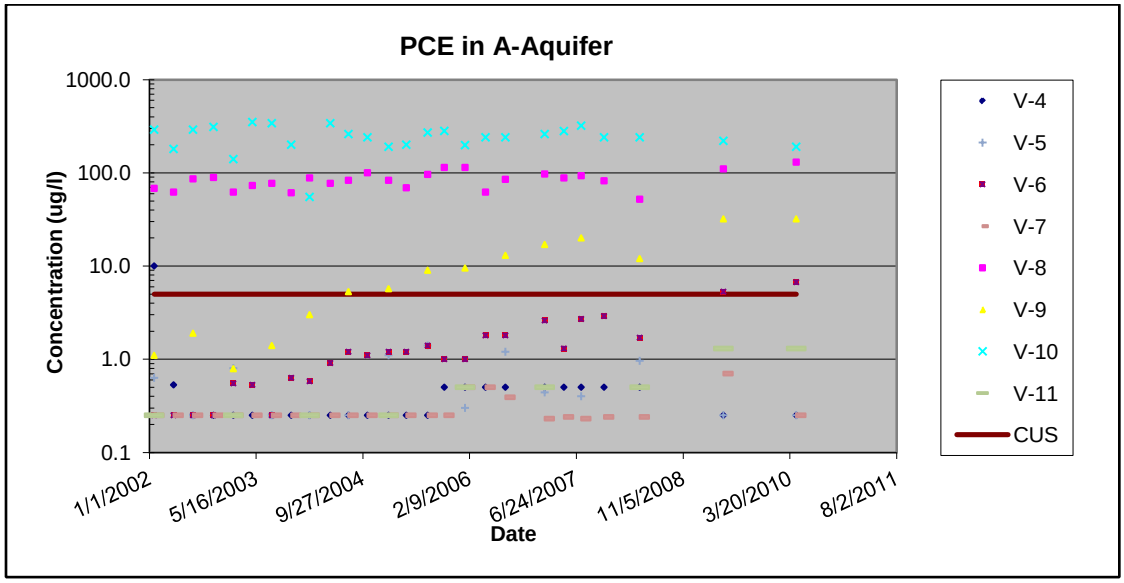

Figure 2. PCE cleanup standard of 5 ug/l is commonly exceeded at multiple A-aquifer wells; however, the Jasco Site was determined not to be the source of this contaminant

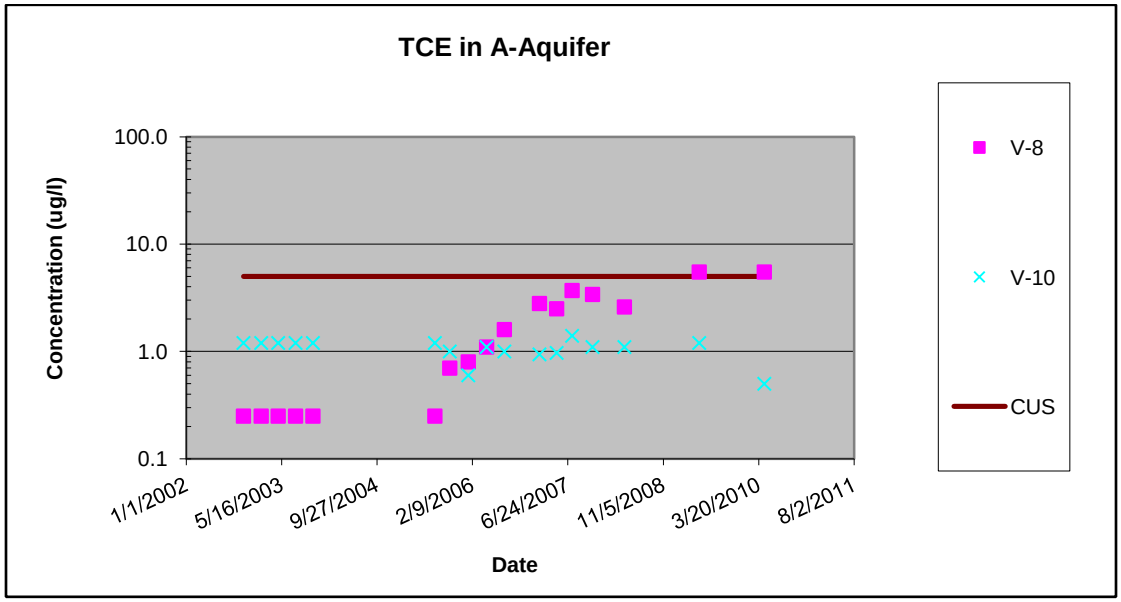

Figure 3 Elevated TCE levels in wells V-8 and V-10 have been detected.

The Mann-Kendall non-parametric test for trend was applied to PCE and TCE data of relevant A-aquifer wells to determine whether the data indicated increasing, decreasing, or stable trends, or whether trend determinations could not be made due to excessive data scatter. Data was used from both the current FYR period, 2007 to 2010, and the later part of the previous FYR period from 2006 to 2007 for PCE and

TCE to ensure the significance of trends. PCE data from wells V-6, V-9 and V-11 indicate a statistically significant increasing trend at the 95 percent confidence interval (Table 12). Well V-10 data indicated no trend (i.e., data stability) with low scatter (defined as having a coefficient of variation less than one) for both PCE and TCE. TCE in well V-8 is significantly increasing at the 95 percent confidence level, while PCE is stable with low scatter.

Table 12. Trends in Groundwater of the A-aquifer

Well ID	Contaminate	Sample Size (n)	Mann-Kendall Statistic (S)	Trend at 90% Confidence Interval?	Trend at 95% Confidence Interval?
V-6	PCE	10	28	Yes, increasing	Yes, increasing
V-8	PCE	10	5	No	No
V-9	PCE	10	75	Yes, increasing	Yes, increasing
V-10	PCE	10	-5	No	No
V-11	PCE	9	121	Yes, increasing	Yes, increasing
V-8	TCE	10	34	Yes, increasing	Yes, increasing
V-10	TCE	10	8	No	No

Analytical Data - B-aquifer.

The only chemical of concern present in B-aquifer groundwater at any time during the monitored period above the cleanup standard was PCE. With a dataset ranging from 21 to 69 ug/l, every data point from all three wells monitored (I-1, I-2, I-3) are in excess of the 5 ug/l limit for PCE. Furthermore, as depicted in Figure 4 and summarized in Table 13, an increasing PCE trend at the 90 percent confidence interval using the Mann-Kendall test for trend is evident in B-aquifer well I3 from 2006 to 2010, though the concentrations have stabilized in I1 and I2. During the vast majority of that period no groundwater extraction occurred on-site since the treatment system was shut off in March 2002, having successfully treated all site-related contaminants in groundwater. These three B-aquifer wells are all either at the downgradient Jasco property boundary (I-1) or beyond the Jasco and former industrial properties within the median of the Central Expressway (I-2 and I-3).

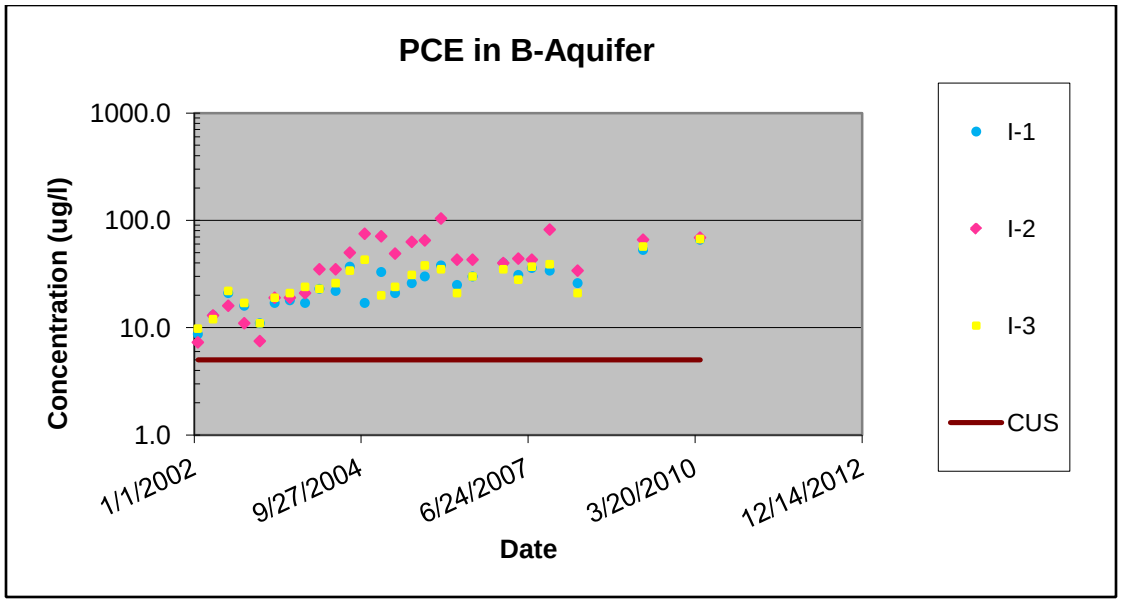

Figure 4. PCE cleanup standard of 5 ug/l is exceeded at all three B-aquifer monitoring wells ; however, the Jasco Site was determined not to be the source of this contaminant.

Table 13. PCE Trends in Groundwater of the B-aquifer

Well ID	Sample Size (n)	Mann-Kendall Statistic (S)	Trend at 90% Confidence Interval?	Trend at 95% Confidence Interval?
I-1	10	15	No	No
I-2	10	2	No	No
I-3	10	21	Yes, increasing	No

Hydraulic Data - A-aquifer

As shown in Figure 5, groundwater elevations in the A-aquifer, as consistently observed in all monitored wells, show a seasonal cyclical pattern superimposed on an overall trend of increasing groundwater elevations over the monitored period of 2002-2006. The overall trend begins to decrease in 2007, and does so through 2010. The seasonal cycle is evident in the previous FYR data from 2002 to 2006, and includes increasing groundwater elevations in the winter and spring months followed by decreasing elevations in the summer and fall months. That data is shown here since the cyclical nature is not revealed when monitoring decreased to once a year after 2007. The data points from 2008, 2009, and 2010 were taken in the spring, normally the highest readings from the wells, supporting the downward trend in groundwater elevations during the period of this FYR.

The increase in both rainfall and A-aquifer water levels through 2006, and the again corresponding decrease through 2010 is readily apparent when comparing the two data sets (Figure 5). Precipitation and corresponding aquifer recharge, along with the inverse, is believed to be the direct cause for changes in groundwater elevations over the period in which groundwater data has been collected.

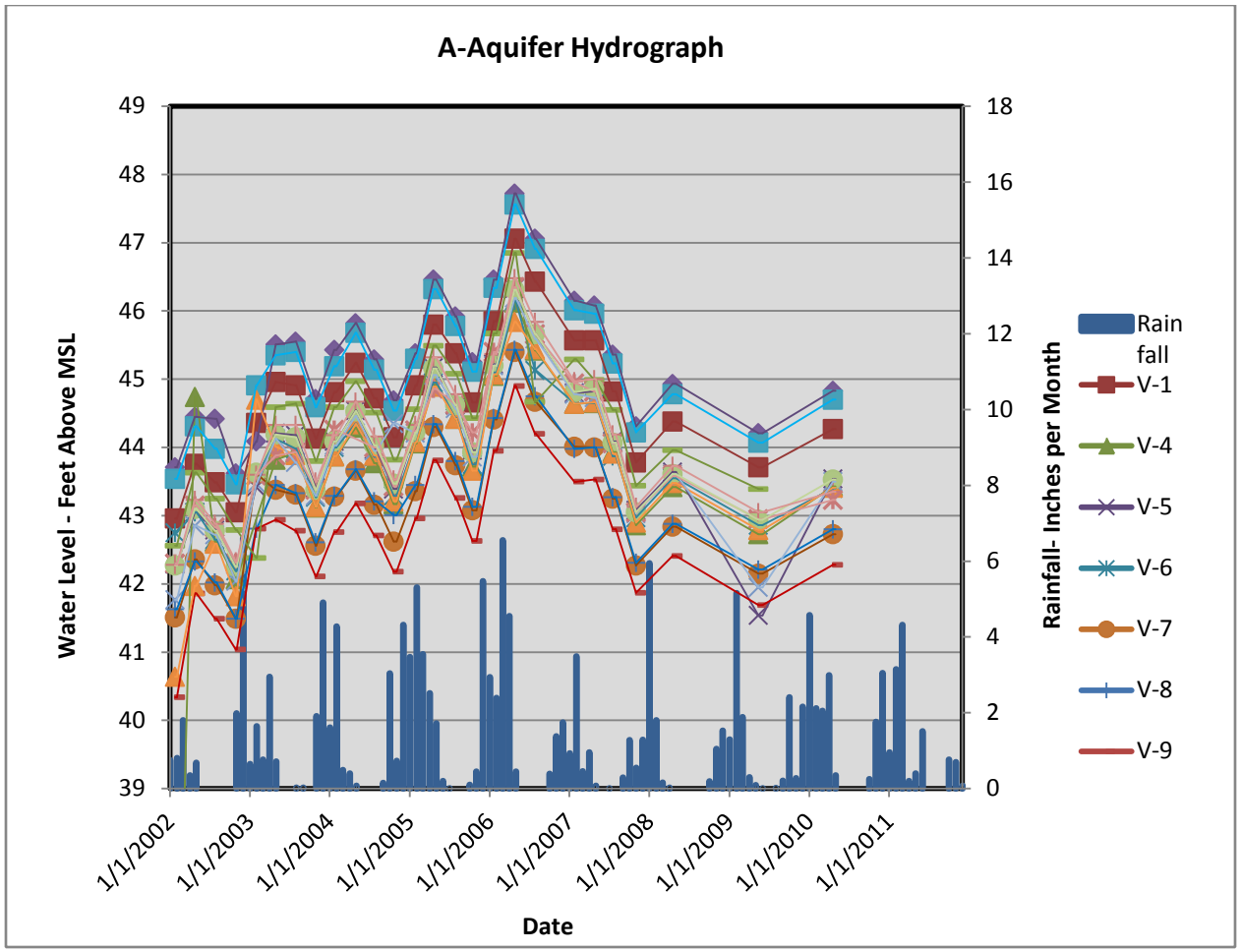

Figure 5. Groundwater elevation in monitored A-aquifer wells and piezometers.

Hydraulic Data - B-aquifer

Figure 6 shows groundwater elevations of the monitored B-aquifer wells. As with the A-aquifer wells, a cyclical pattern of water level increases in spring months and declines in fall months is superimposed on an overall increasing pattern up to 2006, followed by an overall decreasing pattern after 2006. The causes are the same as mentioned previously. Furthermore, since groundwater elevations in the B-aquifer respond so readily to precipitation and are very similar to elevation patterns of the A-aquifer wells, these two aquifers are likely closely interconnected.

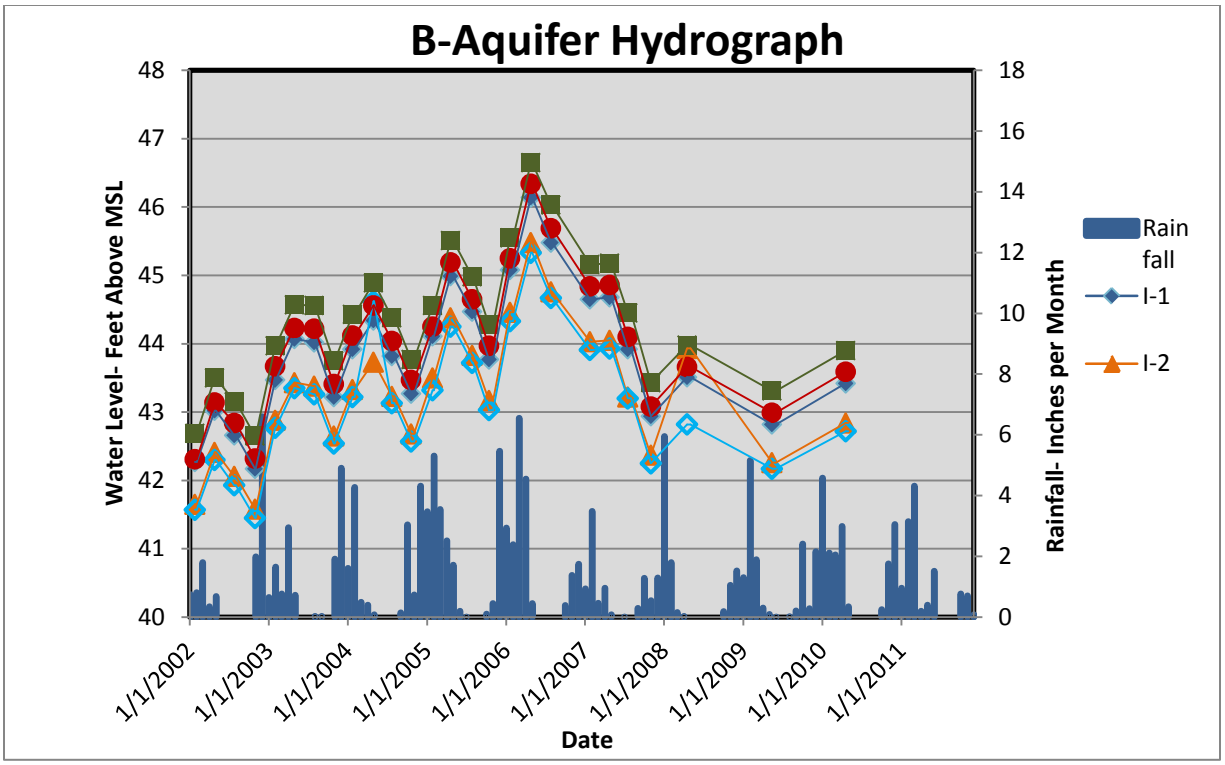

Figure 6. Groundwater elevation in monitored B-aquifer wells and piezometers.

Evidence for PCE from Off-Site Source.

The Final Expert Technical Assistance Report (ITSI 2011) summarized the evidence that supported PCE coming from an off-site source. The evidence included the following arguments:

1) In contrast to some of the principal COCs for the Site such as methylene chloride, TPH as paint thinner, and 1,1,1-TCA, which were known to be used at the Jasco Site, PCE was detected in only a few RI soil samples, and in much lower concentrations, and only in the drainage swale adjacent to the northwestern corner of the Site. This location is hydraulically downgradient of well V-10, which has consistently had the highest PCE concentrations. Elsewhere it is noted that at no time during the monitored history of the Site has the hydraulic gradient reversed, negating the possibility that contaminants could have traveled from northwest to southeast toward V-10.
2) In 1995-1996, 262 soil samples were collected from all potential on-site source areas, with no PCE detected. Fifty of those samples analyzed were within 100 feet of well V-10 (as mentioned previoiusly, this well has consistently exhibited high PCE and is the most upgradient well of the PCE plume on Site), and all contained no PCE.
3) Soil samples from the unsaturated zone during a 1997-1999 Hydropunch investigation were non-detect for PCE along the eastern Site boundary, suggesting that the contamination is confined to the migrating water. The resulting isopleth maps in the final report place the A aquifer plume at the eastern edge of the Jasco site. The plume is generally moving northward with the hydraulic gradient (apart from the pull to the east possibly related to the groundwater extraction at the

drainage swale). The isopleth map for the the B aquifer places the highest concentration of the PCE plume to the east, off the Jasco property, and cross- gradient to the original source of COCs on the Jasco site.

4) Before 1998, Site groundwater contamination was characterized by 1,1-DCA, 1,1,1-TCA, and methylene chloride in the vicinity of the drainage swale. Concentrations of these contaminants decreased over time, mainly due to active remediation. A much different contaminant signature emerged in 1998 and persists to the present, wherein the center of mass of contamination has shifted to the east by about 100 feet, and has a changed composition to a plume consisting almost exclusively of PCE. It is noted that PCE is not a degradation product of 1,1,1-TCA. PCE has continued to increase with time.

Groundwater Analysis and Conclusions.

PCE was determined not to be from Jasco operations as per the 2000 PCE report findings, monitoring data, and the Final Expert Technical Assistance Report (ITSI 2011), and as documented in the 2002 ESD. This has significant implications for the groundwater data evaluation because all other Jasco-related COCs except TCE have been below the ROD-stated cleanup since April 2002. Furthermore, there are no upward trends for any Jasco-related COCs, which indicates future exceedances of the cleanup standards are unlikely. The ex-situ soil remedial measures (contaminated soil removal and bioremediation of UST area soils) combined with excavation and in-situ dual vapor treatment within the drainage swale area, and coupled with groundwater extraction and treatment up to March 2002, appear to have successfully removed COCs in both soil and groundwater at the Jasco Site to below the cleanup standards.

The presence of TCE is a new concern, but appears to be related to the PCE plume. TCE is found in the two wells with the highest concentration of PCE, in the locations at the eastern part of the Site. The flow direction trend at the time of the first appearance of TCE was to the NW, and has since begun to redirect back to the north. If the TCE plume were migrating into the wells at the Jasco Site, they would have originated from an off-site source to the southeast, but TCE is a known daughter compound of PCE. It is likely that the increase in TCE is due to a breakdown of the PCE already in the vicininty, and therefore not a COC for the Jasco Superfund Site.

The two observed patterns of seasonal cyclical and general decreasing trend in groundwater elevation data do not appear to influence contaminant concentrations in any significant way. This is evidenced by a very low correlation between the two datasets.

Groundwater gradient direction has historically been to the north-northeast. Gradient direction shifted to the north-northwest in the period of the last FYR, but has recently shifted back to the historical north. These directions are consistent with the gentle downward northeasterly slope of the local topography and reported surface water drainage off-site to the northeast, and to the northwest to a lesser extent (towards Permanente Creek). The potential shifts of gradient direction correspond with a general increase in water level elevations caused by increased precipitation recharge from 2002 to 2007, and decrease in precipitation and water level elevations since; however, no information exists to confirm whether these events are interconnected. The potential shift in groundwater flow direction has no adverse implications on-site because all Jasco-related COCs in groundwater are and have been consistently below cleanup

standards. The gradient direction may be of concern for future investigation, monitoring, and/or remedial action related to the off-site source of PCE in groundwater.

6.5. Site Inspection

A site inspection was performed February 2, 2010 by Alison Fong and Cynthia Wetmore, EPA. It was determined that the Site is well maintained. There were no problems with the fence and the gate was secure, with several signs posted. There was no evidence of trespassing. Well heads of the Site monitoring wells appeared in good condition. It was estimated that the Site had been mowed within the past six months. The Site Inspection Checklist is included as Appendix D to this report, and photographs documenting conditions during the site inspection are included as Appendix E.

6.6. Institutional Controls

The ROD issued in 1992 requires filing of a restrictive easement in the official Records of the County of Santa Clara which prohibits the use of on-site shallow groundwater as drinking water and restricts subsurface activity that might mobilize contaminants or create a complete exposure pathway. The ROD requires that the restrictive easement remain in place until soil and groundwater cleanup standards are achieved. The restrictive easement was recorded on April 19, 1993.

After the ROD was finalized, a distinct PCE plume was discovered at the Site. EPA and the RWQCB subsequently concluded that the PCE plume did not result from Jasco's operations and that the source was off-site. The ESD issued in 2002 acknowledged the deed restriction required by the ROD, but further required a deed restriction to remain in place until the off-site plume is addressed. The 2002 ESD required that a deed restriction remain in place in order to eliminate the potential for exposure to chemical vapors during future construction activities at the Site and to ensure that the underlying groundwater will not be disturbed.

The Covenant and Environmental Restriction on Property (Civil Code Section 1471) on Assessor's Parcel No. 154-02-001 at 1710 Villa Street in Mountain View, California was recorded on March 29, 2010. The recording restricts use of groundwater, any excavation of soils, and the construction of underground structures without prior approval of the US EPA and the State of California RWQCB.

The restrictive covenant remains on the Site to address impacts from the off-site plume. The deed restriction, though necessary and protective, is addressing a release that is not part of the Site. The ESD issued in 2012 clarifies that the deed restriction is no longer a component of the CERCLA remedy for the JASCO site. The off-site plume was referred to the State of California for further evaluation. The Department of Toxic Substances Control (DTSC) will be the lead oversight agency for the plume. Remedial activities associated with the Site related contaminants are no longer required since the cleanup is complete and risks associated with the Site related contaminants have been reduced to levels protective of human health and the environment.

Table 14 lists the ICs associated with areas of interest at the Site.

Table 14. IC Summary Table

Media	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Notes
Groundwater	yes	154-02-001	Restrict installation of ground water wells and ground water use except for remediation or monitoring.	Not needed for Site-related contamination.
Sediment	No	Not applicable	No IC necessary	None
Surface Water	No	Not applicable	No IC necessary	None
Soil	yes	154-02-001	Restrict the disturbance of soils and construction of underground structures, and mitigate for vapor intrusion should construction occur.	Not needed for Site-related contamination.

6.7. Interviews

Rose Condit, Jasco Project Manager for Shaw, Inc., was interviewed during the site visit on February 2, 2012. The purpose of the interview was to document the perceived status of the Site and any perceived problems or successes with the phases of the remedy that have been implemented to date. Ms. Condit noted that through 2010, when Shaw was collecting groundwater samples for monitoring, there were no problems. The fence was well maintained, and and the owner periodically mowed the lawn. The complete interview is included in Appendix C.

7. Technical Assessment

7.1. Question A: Is the remedy functioning as intended by the decision documents?

The review of Site data, documents, ARARs, risk assumptions and the results of the site inspection indicates that the remedy is functioning as intended by the ROD, as modified by the ESDs. The soil excavation and DVE/SVE system (installed initially as a pilot study) was successful in treating contaminated soil in the drainage swale area reducing the potential of continued contaminant migration to groundwater. The groundwater extraction and treatment system has also been successful in treating the COCs to below cleanup standards. This achievement has been confirmed by 23 consecutive quarters, followed by three consecutive annual reports of groundwater monitoring data below cleanup standards. Because Site COCs have been below cleanup standards since April 2002, groundwater monitoring ceased in March 2010 with EPA approval.

Since contaminants associated with Jasco's operations are now below cleanup standards, restrictions to prevent exposure would normally not be required any longer. Institutional controls are in place to prevent the use of groundwater because of contamination from an off-site source. The Environmental Restriction under Section 1471 of the California Civil Code was recorded on 30 January, 2010 by the Santa Clara County Clerk. This institutional control is appropriate to mitigate contact with groundwater, soil, and soil vapor associated with the off-site plume.

7.2. Question B: Are the exposure assumptions, Toxicity Data, Cleanup Levels, and Remedial Action Objectives (RAOs) Used at the Time of Remedy Selection Still Valid?

Changes in Standards and TBCs

Applicable or relevant and appropriate (ARAR) and "to be considered" (TBC) standards identified in the ROD have been revised. However, these revisions do not affect the protectiveness of the remedy. Additionally, no new promulgated standards affect the protectiveness of the remedy.

Changes in Exposure Pathways

To the casual observer, the Site appears to be a fenced grassy field. Historically the land use on-site was industrial, is currently zoned P (planned community). There is a potential for land use to change to residential or occupational use if the Site were to be redeveloped.

No additional human health routes of exposure were observed. The current and future exposure pathways evaluated in the BRA, ingestion, inhalation and dermal contact, are still valid assumptions.

Vapor intrusion to indoor air was not identified as an exposure route in the ROD. Groundwater concentrations of contaminants have decreased considerably such that concentrations at all wells are below the cleanup levels. However, given the successful soil removal activity and low groundwater concentrations of the chemicals released at the Jasco Site by former Jasco Chemical Company activities, the residual concentrations would not result in a vapor intrusion risk.

No new contaminants have been identified. Compilation and evaluation of existing data was conducted in 2011 which determined that an off-site source is contributing to PCE and TCE levels observed in groundwater (ITSI, 2011). If the levels of PCE and TCE in groundwater due to the off-site source continue to increase, vapor intrusion may become an issue in the future, particularly if future development includes occupied buildings (e.g. residences, work places).

Changes in Toxicity and Other Contaminant Characteristics

Toxicity values for TCE, PCE, PCP, cis-1,2-DCE, and 1,1,1-TCA changed since the last FYR. These changes do not affect the protectiveness of the remedy. While the MCLs for TCE, PCE, and PCP are greater than the current residential tapwater RSLs, groundwater concentrations are either below or near the MCL for all but PCE, which is believed to have an off-site source. Future changes to the MCLs, which are the Site cleanup levels, may occur in the future due to these toxicity factor changes.

Changes in Risk Assessment Methods

No changes to standardized risk assessment methodologies have occurred.

Expected Progress Towards Meeting Remedial Action Objectives (RAOs)

Per the ROD, the goal of the remedial action is to prevent any further migration of contaminants into the groundwater, prevent possible future exposure to the public of contaminated groundwater, and to prevent contamination of the drinking water aquifer. In the over ten years since the completion of the remedial action, soil and groundwater concentrations have met cleanup levels for Site COCs. Since PCE and the remaining TCE are not considered Site COCs, the RAOs have been achieved.

7.3. Question C: Has Any Other Information Come to Light That Could Call Into Question the Protectiveness of the Remedy?

There is no other information that calls into question the protectiveness of the remedy. The remedy is functioning as intended by the ROD, as modified by the ESDs, and is considered to be complete.

No ecological receptors were identified during the baseline risk assessment and none were identified during the five-year review. Therefore, monitoring of ecological receptors is not necessary. Soil and groundwater sampling have confirmed that all cleanup standards for the Site have been achieved. No weather-related events have affected the protectiveness of the remedy.

Standards identified in the ROD have been revised. However, these revisions do not affect the protectiveness of the remedy. Exposure pathways identified in the ROD have not changed. The vapor intrusion pathway has been assessed and determined not to be a risk for the chemicals associated with the Site. Toxicity factors for TCE, PCE, PCP, cis-1,2-DCE, and 1,1,1-TCA have changed since the last five year review. The toxicity values for PCP, PCE, TCE indicate a higher risk from exposure to these chemicals than previously considered, while revisions to toxicity values for 1,2-DCE and 1,1,1-TCA indicate a lower risk. These changes do not affect the protectiveness of the remedy.

Contaminants remain in Site groundwater as a result of a documented off-site source. The off-site PCE plume was referred to the State of California for further evaluation. DTSC will be the lead oversight agency for the plume. A restrictive covenant remains on the Site to address impacts from the off-site plume. Site related contaminants have been reduced to levels protective of human health and the environment.

No other information has come to light that could call into question the protectiveness of the remedy.

8. Issues

There are no issues identified for the Jasco Superfund Site. The remedy is complete and the Site is protective for all future uses.

9. Recommendations and Follow-up Actions

EPA recommends the Jasco Chemical Company Site be delisted from the NPL in accordance with NCP 40CFR 300.425(e), which states that a Site may be deleted from the NPL when no further response is appropriate. The responsible party has implemented all appropriate response actions required, and Site data and data interpretation support this recommendation.

10. Protectiveness Statement

The remedy at the Jasco Site is protective of human health and the environment. All cleanup standards for soil and groundwater described in the ROD, as modified by the ESDs have been achieved.

11. Next Review

This is the the last Five Year Review for the Jasco Superfund Site. All remedies have been successfully implemented and the Site is safe for all future uses.

Appendix A: List of Documents Reviewed

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List of Documents Reviewed

California Office of Environmental Health Hazard Assessment (OEHHA), 2000. Technical Support Document for Exposure Assessment and Stochastic Analysis, Appendix G, Chemical Specific Soil Half Lives, September.

Innovative Technical Solutions, Inc. (ITSI), 2011. Final Expert Technical Assistance Report. Jasco Chemical Company Superfund Site, Mountain View, California. July.

IT Corporation, 2002a. Revised Final Remedial Action Report for Soil. Jasco Chemical Corporation, Mountain View, California, July.

IT Corporation, 2002b. Technical Memorandum. Drainage Swale Area 1 Confirmatory Borings. Jasco Chemical Corporation, Mountain View, California, July. (included as Appendix G to Revised Final Remedial Action Report for Soil, 2002).

Jacobs Engineering,1989. Endangerment Assessment for Jasco Chemical Corporation, Mountain View, CA, Region IX. August.

Jones & Stokes, 2003. Draft Report Human Health Risk Assessment for PCE in Soil and Soil Vapor. Villa Street Site, Mountain View, California, January.

OHM Remediation Services Corporation, 1991. Revised Remedial Investigation Report for Jasco Chemical Corporation Site, Mountain View, California, February.

Shaw Environmental, Inc. (Shaw), 2010. Annual Groundwater Monitoring Report, April 2010, JASCO Chemical Corporation, Mountain View, California.

Shaw, 2009. Annual Groundwater Monitoring Report, May 2009. JASCO Chemical Corporation, Mountain View, California, July 2009.

Shaw, 2008. Annual Groundwater Monitoring Report, April 2008. JASCO Chemical Corporation, Mountain View, California, July 2008.

Shaw, 2006a. Technical Memorandum: Reevaluation of Soil Analytical Data Against EPA 2004 Prelminary Remediation Goals, JASCO Chemical Corporation, Mountain View, California, June.

Shaw, 2006b. Technical Memorandum: Pentachlorophenol in Soil and Groundwater, JASCO Chemical Corporation, Mountain View, California, May.

Shaw, 2006c. Technical Memorandum: Response to EPA Request for Additional Information, Former Dry Well, JASCO Chemical Corporation, Mountain View, California, July.

USEPA, 2012. Regional Screening Levels (RSLs), April 2012. Available at http://www.epa.gov/region9/superfund/prg/.

USEPA, 2012. Explanation of Significant Differences to the 1992 Record of Decision and the 2002 Explanation of Significant Differences at the Jasco Chemical Company Superfund Site in Mountain View, California.

USEPA, 2002. Explanation of Significant Differences to the 1992 Record of Decision at the Jasco Chemical Company Superfund Site in Mountain View, California.

USEPA, 2002a. EPA 530-D-02-004. OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils. November.

USEPA, 1992. Record of Decision. Jasco Chemical Company Superfund Site. September 30.

Appendix B: Press Notices

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Press Notices

PUBLIC NOTICE

THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY BEGINS SECOND FIVE-YEAR REVIEW OF CLEANUP AT THE JASCO CHEMICAL COMPANY SUPERFUND SITE

The United States Environmental Protection Agency (EPA) is conducting the second five-year review at the JASCO Chemical Company Superfund Site in Mountain View, CA. This review will summarize cleanup activities that have taken place since the first five-year review in 2007 and will evaluate whether the selected remedy remains protective of human health and the environment. According to Superfund law, if a cleanup action takes more than five years to complete and/or leaves waste in place, the protectiveness of the remedy will be reviewed every five years.

The JASCO Chemical Company repackaged and formulated chemical products on the 2.05 acre Villa Street site from 1976 until December 1995. Bulk solvents used at the site were received by tankers and stored in eight underground storage tanks. Elevated levels of volatile organic compounds (VOCs) were detected in soils from a swale area located behind the building and in the shallow groundwater. Past waste disposal practices, and possibly leakage from an underground storage tank and surface water, may have contributed to soil and groundwater contamination.

During the review process, EPA will study information about the site and conduct a site inspection. The methods, findings and conclusions of the review will be documented in the five-year review report. A statement of protectiveness will be provided to explain whether the cleanup continues to be effective and recommend improvements, if necessary. Upon completion, a copy of the final report will be placed in the information repository listed below and a notice will be placed in the local newspapers.

EPA invites the community to learn more about this review process and get involved. You may call Viola Cooper, Community Involvement Coordinator, or Alison Fong, Remedial Project Manager, at EPA's toll-free number, (800) 231-3075 for more information. Additional information is available at EPA's web site: **http://www.epa.gov/region9/jasco**

INFORMATION REPOSITORY:-

EPA maintains information repositories that contain the site Administrative Record, project reports and documents, fact sheets and other reference materials. The two locations are:

Mountain View City Hall
Pioneer Room,
500 Castro Street,
4th Floor,
Mountain View, CA 94041

Superfund Records Center
Mail Stop SFD-7C
95 Hawthorne Street, Room 403
San Francisco, CA 94105
(415)536-200

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Appendix C: Interview Forms

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Interview Forms

II. INTERVIEWS (Check all that apply)

1. **Jasco Project Manager** Rose Condit | Shaw, Inc | 2/2/12

Name | Date

Interviewed ☒ at site ☐ at office ☐ by phone Phone no. _____

Problems, suggestions; ☐ Report attached

No problems. Shaw collected annual groundwater samples through 2010. During the sample collection, they would inspect the fence and property. Once over the past five years, a neighbor called about the fence being broken and Shaw went out to repair it. Also the property owner has the Site mowed periodically in compliance with a Mountain View ordinance.

2. **O&M staff** N/A _____ _____

Name | Title | Date

Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____

Problems, suggestions; G Report attached _____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency Department of Toxic Substance Control

Did not attend Site inspection

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Appendix D: Site Inspection Checklist

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Site Inspection Checklist

I. SITE INFORMATION	
Site name: Jasco Chemical Co. Superfund Site	**Date of inspection: Feb. 2, 2012**
Location and Region: Mountain View, Ca **Region 9**	**EPA ID: CAD009103318**
Agency, office, or company leading the five-year review: Region 9 – Alison Fong, RPM & Cynthia Wetmore, FYR coordinator	**Weather/temperature: Warm and Sunny**

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Monitored natural attenuation
- ☐ Access controls
- ☐ Groundwater containment
- ☒ Institutional controls
- ☐ Vertical barrier walls
- ☒ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☒ Other Soil extraction, treatment, and disposal

Attachments: ☒ Photos

II. INTERVIEWS (Check all that apply)

1. **Jasco Project Manager** Rose Condit (Name) Shaw, Inc 2/2/12 (Date)

Interviewed ☒ at site ☐ at office ☐ by phone Phone no. _____

Problems, suggestions; ☒ Report attached

No problems. Shaw collected annual groundwater samples through 2010. During the sample collection, they would inspect the fence and property. Once over the past five years, a neighbor called about the fence being broken and Shaw went out to repair it. Also the property owner has the Site mowed periodically in compliance with a Mountain View ordinance.

2. **O&M staff** N/A _____ _____ _____

Name Title Date

Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____

Problems, suggestions; ☐ Report attached _____

_____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency Department of Toxic Substance Control

Did not attend Site inspection

III. ON-SITE DOCUMENTS & RECORDS VERIFIED Not Applicable

V. ACCESS AND INSTITUTIONAL CONTROLS O Applicable G N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks Gate secure and fence in good shape. No evidence of trespassing.

_____

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☐ N/A

Remarks Several signs were posted on the fence throughout the perimeter warning of no trespassing.

_____

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A

Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.,* self-reporting, drive by) _____

Frequency _____

Responsible party/agency _____

Contact _____ _____ _____ _____

Name Title Date Phone no.

Reporting is up-to-date ☐ Yes ☐ No ☒ N/A

Reports are verified by the lead agency ☐ Yes ☐ No ☒ N/A

Specific requirements in deed or decision documents have been met ☐ Yes ☐ No ☒ N/A

Violations have been reported ☐ Yes ☐ No ☒ N/A

Other problems or suggestions: ☐ Report attached

A deed restriction is on the property but was not verified during the site inspection. There is no evidence of new wells except the former sampling and extraction wells.

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

Remarks_____

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident

   Remarks_____

   _____

2. **Land use changes on site** ☐ N/A

   Remarks No evidence of any changes_____

   _____

3. **Land use changes off site** ☐ N/A

   Remarks_____

   _____

VI. GENERAL SITE CONDITIONS

A. Roads ☐ Applicable ☒ N/A

1. **Roads damaged** ☐ Location shown on site map ☐ Roads adequate ☐ N/A

   Remarks_____

   _____

VII. LANDFILL COVERS Not Applicable

IX. GROUNDWATER/SURFACE WATER REMEDIES Wells only

A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☐ N/A

1. **Wellhead**

   ☒ Good condition ☐ All required wells properly operating ☐ Needs Maintenance ☐ N/A

   Remarks_____

   _____

   _____

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

	Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.). The site is well maintained. The remedy has been shut down and sampling had ceased in 2010. There are no problems with the fence and the gate was secure. There were several signs posted. There is no evidence of trespassing. The site had been mowed in the past six months (estimate). There are some remaining drums and parts of the former treatment system on the property that will need to be removed prior to delisting.
B.	**Adequacy of O&M**
	Not applicable
C.	**Early Indicators of Potential Remedy Problems**
	None
D.	**Opportunities for Optimization**
	None

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Appendix E: Photographs from Site Inspection Visit

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Photographs from Site Inspection Visit

View from Gate looking north to former canopy area (note: empty drums)

Looking northeast from entrance to former truck turnaround area. Apartment buildings are in the background.

Former sampling well (V-11)

Looking northeast towards former warehouse area. Unused treatment equipment stored in far left corner

Former wells, EW-6, EW-6A, V-10, V-10A

Former treatment equipment stored in northern corner of property

Looking south from furthermost northern corner of property

Northern fence and former SVE wellhead. Railroad tracks in background

Sign

Off-Site across Central Expressway – Former sampling well V-08